

PROGRESSIVE MEDICINE





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PROGRESSIVE MEDICINE

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES
AND IMPROVEMENTS

IN THE
MEDICAL AND SURGICAL SCIENCES

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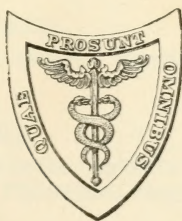
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VOLUME III. SEPTEMBER, 1916

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS
AND BLOODVESSELS—DERMATOLOGY AND SYPHILIS—OBSTETRICS—
DISEASES OF THE NERVOUS SYSTEM.



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PROGRESSIVE MEDICINE.

SEPTEMBER, 1916.

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS, AND BLOODVESSELS.

By WILLIAM EWART, M.D., F.R.C.P.

WHILE the war continues to claim predominant attention in the European medical literature, there has been in the Western Hemisphere no slackening in general research and publication. Even in Europe the urgency of the war evils has perceptibly stimulated investigation. The special war subjects for this report are within the domain of the circulation and respiration.

Surgery has had to deal, on an unprecedented scale, with the destructive results of an intensified use of high explosives. Medicine, much more with the functional disablements from the physical and nervous strain inflicted by the novel conditions of subterranean, submarine, and aerial warfare than with the infective dangers which had been anticipated from the marshaling of upward of 10,000,000 combatants; in particular with the functional disablements of brain shock, of nerve shock, of heart shock, and of asphyxiation. The first of these does not call here for more than a passing comment. The minor psychoses from impressional stress have largely predominated over the deeper psychoses of mental and volitional prostration. The brain, instead of earliest to collapse into raving madness, has prevailingly asserted the same hegemony and first claim to upkeep of function and nutrition which had always been identified with it under starvation. Within the remaining field of internal medicine the new pathological developments have chiefly victimized the all-working and suffering heart, the vegetative or vagosympathetic nervous system, and, under entirely novel attacks, the lungs and the respiratory tract.

With the exception of "trench fever," of septic sore throat, and of "trench nephritis," the infective soil virulence of the highly manured

fields of Flanders has told almost exclusively upon the pathology of wounds. To counteract that evil, antiseptic agents and methods have been called into operation. But there has been a continued immunity from decimating epidemics, excepting the sinister artefact of the Wittenberg outbreak of typhus. Their percentage mortality, even in the unwholesome climates of Gallipoli and of the East, has been kept far below any previous record. As a significant result, our prophylactic war literature has afforded greater attention than ever before to the control of the carrying evil, and to this we shall incidentally refer. That prevailing indemnity from epidemics has also resulted in leaving in the trenches a larger number of susceptible constitutions to run the full gauntlet of their worst hardships and to swell the records of nerve breakdown and of "trench foot." Tuberculosis has not claimed the huge infective toll it had levied during Bismarck's three wars; indeed, hardly any. On the contrary a good deal of latent and of healed tuberculosis has improved under active service, though some relapses have occurred. Rheumatism, too, seems to have remained, in spite of all, below the previous war average. The strict isolation of the fighting front has kept syphilis at a distance. Lastly, "trenching" *versus* "campaigning" warfare has had its one redeeming feature in the regularity and the relative abundance and quality of the food supply, as an insurance against camp fevers, and dysenteric affections in particular.

THE RESPIRATORY FUNCTION.

Air in the Fetal Lungs and the Hydrostatic Test. Schönberg's case (in the *Journal of the American Medical Association*, 1915) is an enigma. Has any similar instance ever been authenticated? If this should be unique it is the more incomprehensible. He found air in the expanded lungs of a seven months' fetus which he had taken out himself from the still intact membranes, the mother having died from pulmonary tuberculosis. No attempt at artificial respiration had been made nor operative measures of any kind applied. No signs of gas-producing infection or of putrefaction could be detected. How can the hydrostatic test be reconciled with this?

The Respiratory Dead Space is that portion of the intrapulmonary capacity (about 150 c.c. in ordinary breathing) in which the air does not undergo any respiratory gaseous exchanges; it is practically the fluctuating aggregate lumen of the bronchi and non-respiratory bronchioles. Its latest investigators, Y. Henderson, F. P. Chillingworth, and J. L. Whitney, have established important facts: (1) Its volume changes with the degree of pulmonary expansion, whether under exercise or at rest (less than 150 c.c. for shallow, 400 to 600 c.c. for deeper, and 1000 c.c. or more for deepest breathing). Its variations follow the respiratory variations in the pleural capacity, less through an active

contraction and expansion of the bronchi than through their passive stretching and collapse. (2) The "virtual," inactive dead space is more extensive for CO_2 than for oxygen, because the exhalation of CO_2 extends to the main bronchi, trachea, and upper passages. (3) But at any set level of inflation the "actual" volumetric dead space undergoes active variations (apt to show rhythmic periods of several minutes' duration) which, in quiet breathing, may amount to 30 per cent. of the mean volume. (4) These variations are presumably due to active myobronchial contraction and expansion, probably (according to the facts reported) under the expanding stimulus of good air or the constricting stimulus of bad air, or under the influence of favorable or unfavorable temperatures. (5) In the Turkish bath, the stage of flush and of profuse perspiration determines a great increase in the CO_2 diffusions from the dead space by hyperemia of its surface. Part of that excess is inspired back into the alveoli. As the CO_2 alveolar respiratory quotient may be only a little above 0.7, while its quotient in the gaseous mixture expired into the atmosphere may rise much above 0.9, it is plausibly inferred that as much as one-half of the total CO_2 may then be contributed by exhalation from the dead space. (6) In asthma the problem is much complicated by the constricting spasm. The chronic and progressive chest distention might be viewed as a sustained compensating effort to stretch out the dead space passively from its tonic bronchial contraction. Haldane¹ localizes to the "atria" (which receive the termination of the ultimate bronchioles) the bulk of the great expansion of the effective dead space in deep breathing. He emphasizes that any estimations of the composition of alveolar air from the composition of the mixed expired air would be fallacious if they were reckoned on the assumption that the dead space was a constant quantity.

The Effects of Artificial Atmospheric Oxygen Concentration. Oxygen, our life-giver, is also the pharmacological type of our "alteratives." Active for better as a stimulant within wide limits of progressive administration without revealing any poisonous property, its further supply becomes deleterious; though as a gas it does not even then strictly qualify for any clear definition as a "poison." We owe to Paul Bert's classical investigations most of our present knowledge of the fatal or damaging effects of "oxygen pneumonia." H. T. Karsner,² in his paper on the "Pathological Effects of Atmospheres Rich in Oxygen," shows that atmospheres containing from 80 to 96 per cent. oxygen under normal barometric pressure, usually produce in animals, in one or two days, congestion, edema, epithelial degeneration and desquamation, fibrin formation, and, finally, an irritative pneumonia described by him as a fibrinous bronchopneumonia. While oxygen

¹ American Journal of Physiology, 1915.

² Journal Experimental Medicine, 1916.

deficiency affects hematopoiesis, he could not identify in the blood, spleen, lymph nodes, or bone marrow any pathological changes resulting from that excess.

The Complex Mechanism Adapting the Oxygen Capacity of the Blood to the Requirements of the Tissues at Varying Altitudes is reduced to comparative simplicity by the experiments conducted, in 1915 (in association with H. C. Dallwig), by A. C. Kolls and A. S. Loevenhart in their self-regulating "respiratory chamber" for small animals. The three coöperating mechanisms—of external respiration, of vascular adaptation through the medullary centres, and of bone marrow productive activity—are harmonized under the common stimulus from a low oxygen partial pressure by similar reactions, though the respiratory centre controlling the respiratory movements, and the vasoconstrictor and cardio-inhibitory centres are far less sensitive to CO_2 than the bone marrow, upon which the blood is dependent for its oxygen capacity. By excluding the accessory effects of altitude, such as powerful light, temperature changes, increased evaporation, reduced carbon dioxide tension, and reduced barometric pressure, the Wisconsin experiments leave only one factor in common with high altitude, namely, the reduced oxygen partial pressure.

The entire organism reacts by increased activity to that stimulus, presumably through the bone marrow, as they have identified a numerical increase in red cells, in addition to the relative increase (from evaporative concentration of the blood plasma) immediately induced by a rise into a rarefied atmosphere. Under an oxygen pressure reduced to about 14 per cent. of an atmosphere (the optimum might be approximately 10 per cent.) the hemoglobin increase, first noted from the fifth to the seventh day, rose after a while to 43 per cent. per kilo of animal. Sometimes the body weight increased correspondingly. The marrow reaction is practically the same as after hemorrhage. It cannot be suppressed by increasing the oxygen starvation, and it is efficiently worked by any mere excess of CO_2 .

Acidosis. The index of a rising acidosis is in the falling CO_2 tension of the alveolar air. Its clinical evidence is the onset of air hunger. We owe to patient gasometric investigations, in which Francis W. Peabody has taken a prominent share, the simplest of tests, and also the simplest explanation for acidosis. The early and elusive false steps in metabolism can only be summed up in the terminal formula of the end-reaction, as the H-ion concentration in the blood. By this we mean the "aggregate acid valency" made up of the H-valencies special to each of the acids which combine to diminish the alkalinity of the blood. The weakest of these is our physiological carbonic acid easily titrated as CO_2 . The morbid acids are non-volatile. As they cannot be exhaled, their blood concentration is progressive whenever the kidneys are unable to eliminate them, unless it be therapeutically

checked by alkalies. The normal fluctuations of our H-ion are integrated in those of the CO_2 in the pulmonary capillaries which transmit to the alveoli an equivalent gaseous tension (from 38 to 45 mm. of partial pressure). The carbohydrates supply most of the higher CO_2 values, and also the abnormal acid values of acidosis. Their physiological office is to supply fuel and stimulus for our vital neuromuscular mechanism, our cardio-vaso-respiratory system, working under stimulation from the most CO_2 -sensitive of the medullary centres, the respiratory. The normal result is a perfect balance between CO_2 discharge and oxygen supply.

The hyperpnea of air hunger mars this by keeping the CO_2 low in the alveoli in spite of its overproduction in the tissues. CO_2 is then superseded by the morbid acids in its office as the main medullary stimulus. Their concentration in the blood cannot rapidly fluctuate, and therefore cannot automatically regulate the medulla. On the other hand, the oxygen is kept high, and this favors the acidosis by an increased but incomplete tissue combustion, which furnishes, besides CO_2 , intermediate or aberrant acid products. That is the accepted explanation for the "paradox" that a diminished alveolar CO_2 tension indicates, and accurately measures, an increase in the total acid production and in the H-ion concentration. In diabetes, as shown by Allen, a temporary starvation, to cut off the carbohydrate supply, is an immediate and most efficient remedy. Although the morbid acids (acetoacetic and beta-oxybutyric, together with acetone) are still on direct supply from the fat stored in the body, they are then given the full benefit of the remaining tissue reserves of neutralizing bases. By quantitative testing, Peabody finds that a reduction of the alveolar CO_2 tension to 35 mm. means danger, and to 20 mm., impending coma. In coma the lowest reading was 6 mm. In nephrogenous acidosis, identified as renal by the fall in the phenolsulphonephthalein output, and by the increase in the non-protein nitrogen, urinoscopy is unreliable because of the renal impermeability; but the alveolar test works true. In cardiac dyspnea the mechanism is different. Peabody describes two types of it. The depressed CO_2 tension indicative of acidosis, when it quickly rises under circulatory stimulants, was due to incomplete tissue oxidation from blood stagnation. When it fails to rise it is due to structural renal disablement, not merely to passive renal congestion.

Fifty observations on ten healthy men by Beddard, Pembrey, and Spriggs¹ gave average values of 5.57 CO_2 volumes per cent. and of 14.98 oxygen volumes per cent. In diabetic coma the CO_2 falls to 1 or 2 volumes, but under massive sodium bicarbonate doses it may rise again, even beyond the normal level. E. P. Poulton urges that when acetonie bodies have been identified by the nitroprusside and the ferric

¹ British Medical Journal, September 11, 1915.

chloride tests the only reliable measure for the acidosis is the alveolar CO_2 pressure. A reading of 2 per cent., particularly if the drop was sudden, means impending coma; one of 3 or 4 per cent., a probable delay of perhaps two or three days. The estimation is important, as immediate treatment is the only chance of averting the fatal syndrome, and in some cases might postpone it for a considerable time.

"Colds" and the Influence of the Atmosphere upon the Nasal Mucous Membrane. We have not yet fully grasped the principles of our respiratory physiology as a guide for its rational and efficient artificial indoor management. Leonard Hill tersely describes the main upshot from his recent elaborate inquiry into the ventilation of the House of Commons. "Cold feet and heated heads" are the worst of all engineering for any good legislation. The Roman architects had aimed at the reverse in their sumptuous dwellings by a hypocaust which warmed the floor and by unglazed upper inlets which afforded cool brows and noses. His exposé in the *British Medical Journal*, April, 1916, that systematic upset of the automatic "nasal regulation" of the respiratory circulation is profitable reading. He was allowed to partition off a section of the legislative chamber for comparative trials of the opposite plan. His own nasal asymmetry, with a narrowed left passage, facilitated his demonstrations. Sitting in the unaltered ventilation, his left air-way was soon completely obstructed. Each time he entered the corrected atmosphere it was rapidly restored to patency. This observation and that of one-storied foundries in which a fierce heat of the flooring is associated with ample open-air supply from the roof are used as a basis for an illuminating exposition of our natural mechanism and of the needful artificial mechanisms; and of the working significance of atmospheric heat and cold, moisture and dryness, stagnation and movement, free renewal and staleness when confined, and of the physiological significance of hot or cold feet, and of an overheated and dried or of a refrigerated and weeping nasal mucous membrane.

1. *Temperature.* Extreme cold out of doors kills us; it never gives us a cold; witness the shipwrecked on the ocean and also our Nausicaas with chilled feet on the beach. The nose manages its own circulation, and, strange to note, largely too that of the body. The first thing it has to do is to keep up its own heat against nasal congelation, for not only the nose, but the whole face and head too are provided with the most abundant circulation. Yet it cannot of itself always keep the feet warm. Even on the Arctic march they may be uncomfortably cold. But this never breeds a "cold." Neither does the coldness of the "trench-foot," a specially combined osmotic result of local chilling and of water-logging and soakage of the skin (sea-water soaking does not cause it); together with a poisonous bacterial concentration within the unchanged footwear. Animals thrive in the open cold field, or in

draughty byres. Fowls decline in artificially heated pens. The incubator chick is delicate: likewise a coddled child.

2. *Draughts* cannot be tolerated by some whose nasal and cutaneous vasomotors are incompetent from age or exhaustion, or acutely irritable as in the asthmatic and the rheumatic. Why have any draughts? The open air has none, but only winds. In that matter a separate legislation is clearly needed for the pathological groups. *Vae victis*, in our daily railway carriage conflicts. In the nursery the nasal incompetence of the few has ruled tradition, and its traditions have long ruled the unhygienic habits of the nation. "Science may beat against the door, but tradition holds it fast."

3. *Moisture and Hygrometry*. Air, when saturated, holds at normal body temperature 19 grains per cubic foot; at 90° F., 14.8 grains; at 80°, 10.9; at 70°, 8.0; at 60°, 5.7; at 50°, 4.1; at 40°, 2.8; at 30°, 1.9 grains. When inhaling air at 30° a man will exhale at rest in his saturated expirations (amounting to 1 cubic foot of air in about four minutes) a supply of water of 17.1 gr. (19 minus 1.9) for every four minutes; but during exercise the same for every minute or even half minute, thus totaling up to 2 or 3 ounces of water per hour. This output is not wholly "from the nose." Under exercise other parts of the air-way share increasingly in the evaporation of a beneficent outpouring of lymph. In the saturated hot atmosphere of a spinning mill (holding at 75° 9.4 grains per cubic foot) the nose will only have to evaporate 9.6 grains per minute, namely, about 42 per cent. less than out of doors on a wintry day. This opens the mind to the extreme activity, under exposure to intense cold, of the nasal evaporation and of the outflow of nasal lymph from the circulation to maintain it. The high humidity of tropical saturated air enables us to save that output for the sweating which has to cool our body. Turning then to the sudden changes from overheated indoor air to extreme cold outside, where should we be without a ready and wide range of nasal adaptive circulatory regulation? Dry cold air does not check the nasal evaporation; neither does it conduct much heat away from the cutaneous nerve endings. But our wintry damp air (much more our cold mists, with cold particles to vaporize before the membrane can warm the air and start to evaporate) is a great strain and education for our vasomotor and secretory nasal mechanisms. Any overstrain is easily productive of colds in those not hardened but softened. Our normal safety and comfort are from "adequate skin and nose reactions," and we are specially sensitive and reactive to any change in the rate of our nasal evaporation.

4. *Nasal Circulation and Exudation*. Cold outer air necessitates greatly increased local circulation to keep the membrane at body temperature and to keep it evaporating. Its immediate effect is to make the nose taut against any venous stagnation and to increase

the rapidity of the capillary flow, thus easing the path for transudation as a physical means to our nasal sanitation and, therefore, to our protection from microbial inroads. It is clear that the peripheral situation and exposure of the nasal membrane necessitates a local heat production in excess of that of the intrapulmonary bronchial membrane. Some attempt has been made by Hill to estimate this in calories. To raise to body temperature 1 liter of the air inspired, about 0.3 of a small calorie, is required for each degree centigrade. Breathing 40 liters per minute under strong exercise in cold open air a man may lose four or five large calories in warming the inspired air instead of only 0.38 when sitting in a room at 65° F. A table is given of the readings from a delicate thermometer introduced below the inferior turbinate to record the temperature variations of the membrane and of the secretion it pours out to keep itself warm. Another table shows the amount of that secretion as estimated from comparative weighings of plugs of absorbent cotton wool before and after their insertion for three minutes, the membrane having previously been mopped dry. The estimations were made in this way after three minutes spent alternately in a warm room and in a cold wind on the roof. The effect of cold air was remarkable; though probably underestimated in the record, as some of the fluid could run off down the probe from the saturated plug before the three minutes had run out preliminary to the wet weighing. Moreover, the nose is constructed for a backward flow, the limited anterior flow alone forcing the use of the handkerchief.

An investigation of the function of the nasal membrane with speculum and probe had been instituted three years ago with the assistance of F. F. Muecke. In close, stuffy air the membrane (probably also that of the sinuses) is congested and pits under the probe. The headache is due to this obstruction; not, as alleged, to toxic absorption. It is relieved by cold air, which tightens and pales the membrane. Another remedy is to warm the *cold feet*. The body temperature remains the same with cold feet; but Hill's katathermometer (exhibited before the Royal Society, 1916) showed that the members' feet were being cooled at a 50 per cent. greater rate than their heads. Much light is thus thrown upon our familiar conceptions as to the genesis of infective colds from open cold or confined warm air, from cold or warm feet, and from an exposure of the skin or its protection. Much more light may yet arise from the further study of the adaptive and regulatory atmospheric function of the nasal membrane. The immediate object lesson from the latter supports the latest surgical management of wounds, as suggested by Sir. A. Wright. The osmotic force of salt pulls out immunizing lymph, and this also floats away the infective bacteria. For this any premature scabbing must be prevented. Additional surgical problems remain for study; those of the temperature of wounds and of their blood flow, insofar as these may be influenced

not only by dressings but by the relative dryness, temperature, and movement of their ambient atmosphere.

How to Blow the Nose. E. Harrison Griffin, who attributes at least 75 per cent. of our catarrhs to the inefficient cleansing of the nostril by our faulty handkerchief technic, teaches us at last the true method in this year's *Western Medical Times*. When this has received its *imprimatur* from the department of hygiene it ought to find its way promptly to the infant school for practical tuition. In reality, the theory of the handkerchief has never been taught to our teachers. Its mysterious technic is left to be variously worked out by each individual child on the basis of "results." Under its indispensable veil one thing is never acquired, the *tactus eruditus* of primitive man's open "finger and thumb" method. This alone can adapt the pressures to the resistances, right and left. Nose-blowing should be, as Griffin aptly expresses it, a double-barreled performance. The obstruction may be bilateral. As this can never be at any moment of symmetrical degree, the more rational method uses two separate full-pressure explosions in succession instead of attempting their combination. This avoids the evils he deprecates. The complete closure of the less obstructed nostril throws into the other the entire blast from both lungs. The resulting intranasal pressure *a tergo* is great, but only for an instant; being effective, it is immediately relieved. On the other plan it will never rise so high, owing to the air leakage through the less obstructed nostril. But as it is usually ineffective it will last during the entire effort, and it will have to be renewed perhaps more than once. Each time the entire nasal fossa remains part of the vast pulmonary compressed-air chamber, together with both Eustachian tubes. If these are patent, compressed air is driven through them into the tympanic cavity; if obstructed by semi-fluid, and probably infective secretion, this will be driven toward it, with infective damage in addition to the mechanical. All this can be prevented by a more enlightened tuition, with much saving of sentimental distress for the helpless performer, and of much noisy disturbance for his audience. The unilateral or divided method is the shorter one, as it does not miss fire. It is the only esthetic one, as it needs no trumpeting.

PHYSICAL SIGNS AND METHODS.

The Thoracimeter described by M. J. Fine,¹ of Newark, N. J., is a modified pelvimeter provided with two-hinged chest-plates: A dorsal plate, for firm application just above a spinous process, and an anterior plate to be placed midway between the sternum and the head of the humerus. The comparative measurements of the right and of the left

¹ Journal of American Medical Association, January, 1916.

anteroposterior excursions of the apex during quiet and deep breathing are read off in centimeters on the upright graduated scale. The measurements can also be compared at other chest levels. Pending further investigations, he has been able to corroborate Woods Hutchinson's statement that in plithisis there is an increased diameter between the ensiform cartilage and the spine at the level of the scapular angle. Unfortunately the pelvic callipers, which I tried some years ago, do not report the circumference expansions, which are normally greater in the transverse than in any other diameter. Moreover, for fine readings we require not a reducing but a magnifying moving index. Nothing short of a most elaborate apparatus, such as Ransom's, can faith-

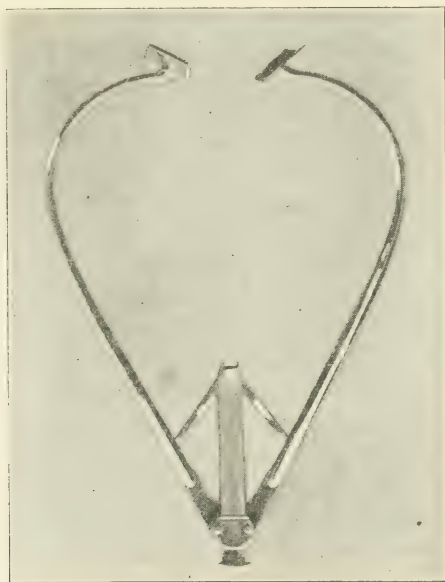


FIG. 1.—Thoracimeter, showing attachment of plates to the round tips of the pelvimeter.

fully record the "thoracic" excursions. But the "pulmonary expansion" values are largely made up of abdominal movements; and these are not registered by chest measurers.

"**The Paradox Thorax**" is Follet's abbreviation for thoracic retraction instead of a bulging over any pleuritic effusion. In O. Cignozzi's case, described in last year's *Policlinico*, the mechanism appears to have been rapid partial reabsorption of an empyema. After clearing this away by means of a resection of the seventh rib, three weeks sufficed to restore full thoracic expansion.

Cervical Ribs may be productive of a great variety of symptoms, some of which are first brought to the physician's notice. He should

be familiar with them for the sake of a correct diagnosis of their cause and for their efficient treatment. Muratori, of Naples, has compiled 200 cases, 86 of which were bilateral. A single supernumerary rib is most frequently on the left side. Usually the symptoms do not develop any severity before the age of fifteen or after thirty. Resection becomes necessary when the edema of the arm cannot be controlled or the nervous sufferings subdued by electricity or salicylates or by other remedies.

Vocal Resonance in Pleural Effusion. The practical outcome of C. M. Montgomery and G. A. Eckhardt's¹ paper is that in any "doubtful" case with normal or increased vocal resonance, fluid should be suspected; and that whenever fluid is detected, and the vocal resonance is normal or increased, the possibility of solid lung within the fluid should be borne in mind. Their experiments with unexpanded fetal lungs show that sound vibrations pass readily into water from the large bronchi as well as through the water, but alveolar inflation breaks them up, dims their clearness, and gives them the buzzing character of our clinical "vocal resonance." In reality, fluid in the pleura, by compressing the lung, restores their original clearness to the confused laryngeal vibrations.

The Local Auscultation of Vocal Vibrations by Solid Conduction, by means of a novel clinical apparatus, for which the Lallemand prize in physiology for 1915 was awarded to Glover, was demonstrated in February before the Académie de Médecine. It is claimed that a bilateral comparison of the sounds, which it conveniently transmits at a distance from the patient, affords a reliable estimate of any changes in the underlying air passages, and provides a valuable addition to the earliest diagnosis of tubercle by physical signs.

D'Espine's Interscapular Whispered Bronchophony is rightly assessed by H. Stoll as a general, rather than a specific, glandular hilum sign. Sometimes it is not present when the glands are enlarged; while aortic aneurysm may produce it. In children it is highly suggestive of tuberculosis. He thinks it is well worth testing also in old age, where pulmonary physical signs are apt to be inconclusive, as a means of differentiating tuberculosis from mere bronchitis or emphysema.

Spiroscopy is the name given by Pescher to his clinical respiratory method, which was approved by the Académie de Médecine at its first sitting in 1916, at the recommendation of A. Robin. His spiroscope is a modification of the water spirometer; a bottle filled with water inverted into a pneumatic trough, with an india-rubber tube hooked into its neck to conduct into it the air expired by the patient through a mouth-piece. In short, it is an "expiratory bottle." That more descriptive name had for some time past been substituted for

¹ Archives of Internal Medicine, June, 1915.

that of the "respiratory bottle," under which expiratory therapy was introduced into my wards at St. George's Hospital upward of twenty years ago for daily use in convalescence and in suitable cases of illness. Its original idea was suggested by the special expiratory needs of emphysema. But its physiological principle applies all round, as "the mechanical treatment" for all pulmonary and circulatory inadequacy. We may treat the heart by drugs as a whole; but we have no drugs special to the *right heart*. The only direct way of specializing our treatment to the latter is to relieve its overcharge by an increased pulmonary activity; and the only means to ensure a full inspiration is to empty the lung by a full expiration. We have since then learned that the only means to ensure a perfect systole is to secure, as this respiratory activity can do, an efficient systolic neural impulse at the base of the right ventricle. The significance of my clinical teaching, "look after the right heart; the left heart will look after itself," is that in all circulatory disablements the thing to avoid is systemic exertion, which in health provides our "daily constitutional" cardio-respiratory exercises, and that, therefore, exclusive right heart exercising is the first of all exercises to prescribe for the bed-ridden invalid. His easiest and safest form by far is to blow bubbles through the old-fashioned expiratory bottle in short and gradually increasing spells. This stands upright with its conducting tube steadily immersed to the bottom by a small weight. The essential difference from Pescher's spiroscope is in the water pressure. This, on the old plan, is not a varying, but a constant, resistance; it can be minimized to any degree by using less water in the bottle. In the inverted bottle the resistance is minimal at first; but an increasing driving pressure is needed to depress the water level in it. Excellent results with the spiroscope are reported in all forms of inexpiration. But the unique capabilities of the expiratory treatment for right heart inadequacy do not appear to have been given a trial.

The Transcapular Subresonant Band. We owe this notable addition to the normal dorsal percussion map to Clive Riviere's publication, in last year's *British Medical Journal*, of a "New Sign" for the early diagnosis of pulmonary tuberculosis and of its pretubercular stage. Its genuine importance, as estimated by the present writer in the same journal in a short description of its mode of production and significance, is mainly anatomical and physiological rather than diagnostic, with a special bearing upon the study of Abrams' theory of pulmonary reflexes. That theory had been adopted by Riviere as the basis of his new method of diagnosis. Assuming that a local pulmonary deflation, with resulting dullness, was capable of being produced reflexly by the superficial stimulus of a local thoracic percussion, he had noted in early and in pretubercular cases an exaggerated liability to its production over the area in question; and, much more, the preëxistence in

them, independently of any artificial mechanism, of a subresonant dulness over that area, the dulness being susceptible of intensification by heavier strokes. Briefly stated, the upshot of the tests applied by the writer is as follows: (1) Riviere's band is a genuine subresonance. (2) It is not restricted to any pathological state; it is found in any

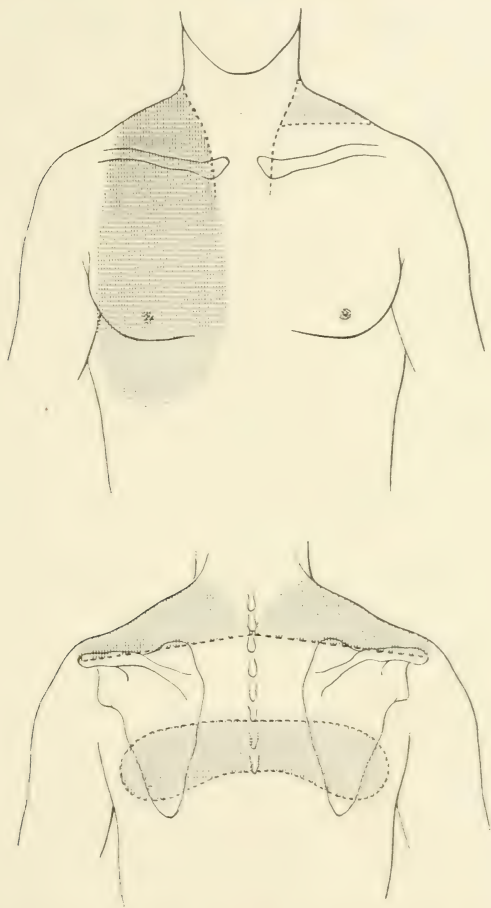


FIG. 2.—The percussion changes front and back produced by concussion of the chest wall below the right clavicle (Abrams' reflex). The inner line of Krönig's apical resonance is marked out in front.

and in every subject percussed in the same attitude. (3) Its intensification by heavy strokes is a genuine reflex. (4) But the reflex is not intrapulmonary of the lung; it is extrapulmonary within the thoracic wall. (5) As neither ribs, or cartilages, or ligaments can react perceptibly to percussion, the thoracic muscles must be the seat of any reflex increment in dulness produced in the thoracic wall. (6) The

muscles are known to be reactive by reflex contraction in health; but specially reactive, in the shape of myoedema, in phthisical and also in phthinoid subjects. (7) In that peculiarity there is some clinical diagnostic value; but this can only be relative and confirmatory; not absolute, or of itself conclusive. (8) If this physiological myotonic interpretation can be firmly established for the local dulness in question, it would be applicable to all local thoracic dulnesses elicited in the same manner; unless some other mechanism would be experimentally proved to account for their production in some different way. (9) In Riviere's sign, the fundamental proof is afforded by anatomy; the subresonant dulness is bound up with a special attitude of the thorax; if this be modified, thereby modifying more or less the anatomical relations of bones and muscles, it then diminishes, or completely vanishes. (10) The attitude productive of the typical outline depicted by Riviere is the clinical attitude prescribed for all dorsal percussion, a slight forward inclination of the head, of the upper spine, and of the shoulders and arms. (11) Any departure, whether of head, or spine, or shoulder, from that symmetrical posture will mar the definition of the typical outline. (12) Overextension of the head and spine will mar it completely, the forward, adductive extension of one arm, or its backward, abductive extension will variously alter it, unilaterally. (13) The main evidence, however, is supplied by substituting, for the slight inclination, a forward flexion of the spine; if the spine be sufficiently bent, not only does the dulness disappear, but it is replaced by a considerable resonance, in which no thumping can induce any phase of dulness. (14) A crucial confirmation is readily obtained by unilateral bending to the right or to the left; the convex thoracic side becomes then fully resonant, in contrast with the dulness of the other. (15) In a symmetrically bent posture, both posterior lobes are evenly expanded; neither of them yields any "pulmonary" reflex although there is no extrapulmonary obstacle to that production. (16) In reality, there is no reflex dulness production whatever; this is because that forced attitude is a major and sustained obstacle to any myotonic reflex of sufficient degree to produce any perceptible dulling effect.

In conclusion, the disappointment of our diagnostic hopes is amply compensated. Riviere's discovery stands as a valuable contribution to our knowledge of dorsal percussion. It is entitled to wide recognition, and to a place in our teaching of practical medicine. But it has a much larger theoretical significance. Its greatest value is the light which it throws upon the interpretation of Abrams' observations, and its availability for the study and for the testing of the pulmonary reflex theory.

The Comparative Intensity of the First and the Second Sounds gives us, according to O. Leyton's note in the *Lancet*, 1916, the most reliable estimate as to cardiac efficiency or failure. This is the only test based upon precise objective and measurable data. Bock's stethoscope

enables us to compare the two sound values, at the apex and at the base respectively. Normally, the first sound at the apex should be approximately twice as intense as the second at the base. Fractional departures from that standard may be of any degree, constituting a relative range of diminishing efficiency, till an absolute landmark is reached in an "equality" of the two sounds. This is the index of distinct inefficiency, calling imperatively for rest and treatment. Beyond this, a "reversal" of the normal difference into a predominant intensity of the second sound is indicative of grave danger. In Leyton's experience, it has a fatal significance, justifying a prognosis of impending sudden death. The prognostic value of these observations is greater than that of the true pulsus alternans, in that the changes in the sounds precede the onset of the latter. There may be, therefore, also greater life-saving value in this test.

An Eyeball Bruit should be added to the thirteen eye signs in exophthalmic goitre enumerated by L. F. Barker. D. Riesman¹ narrates his recent rediscovery of it. It had been first observed by Snellen and reported by Donders (1871). Duroziez (1874) and Hueter (1878) both mention having heard bruits over the eye in health. Schönfeld (1881) heard an ocular hum, synchronous with the pulse, in a case of Graves' disease; and Carrington (1886) and Drummond (1887) have also given clear descriptions of it. It is not a constant sign in that affection. Riesman has often failed to find it. He has noticed a similar sound several times in aortic insufficiency.

The "Muscle Phenomenon," as a Sign of Exhaustion from Overexertion, has been observed in about 85 per cent. of the soldiers invalided from the field, and described by E. Mayerhofer.² It occurs with special frequency after fevers and dysentery; though it was most pronounced in the absence of that influence. He attributes it to a toxic fatigue change in the muscles. Its disappearance after two to four weeks in the stronger subjects and its prolonged duration in those with less recuperative power bear out that view. A sharp stroke with the ulnar edge of the hand upon the biceps in extension hardly elicits any visible myoedema in the healthy. In a state of exhaustion the local muscular contraction can be not only felt, but seen as a transverse ridge of varying length, height, and duration according to the degree of exhaustion. It may reach from 5 to 7 cm. in length and 1 cm. in height, and up to fifteen seconds in duration.

Walking and Running. A great deal of health can be obtained from either. F. G. Benedict and H. Murschhauser's papers³ refer in terms

¹ Journal American Medical Association, April 29, 1916.

² Med. Klinik, January 16, 1916.

³ Benedict, F. G., Proceedings of American Philosophical Society, 1910. Benedict and Murschhauser, Energy Transformations during Horizontal Walking, Carnegie Institute, Washington, Publication 231, 1915.

of energy and of mechanism to the mathematical values in which athletes are directly interested. *Chi va piano va Contano*; walking is the only suitable gait for long-distance explorers. For mere exercise, economy of labor is a secondary consideration. The essential is that the body should be exercised in all its parts, as evenly as possible. Walking and running are both in a general sense whole-body exercises; but with important differences. These are more accentuated in the racing styles, but quite manifest in the quieter paces prescribed by the hygienist. The work of the muscles that move the body is more rapid and brief, as well as more forcible, in moderate running than in moderate walking. The work of the muscles that steady the body front and back is much greater in running. At a moderate walking pace the vertebral disks are steadily kept under pressure; in running they get at each lift a brief interval of decompression. In running, too, the articular cartilages of the lower extremity get longer rests than pressures. The visceral events, both active and passive, are in stronger contrast. For the viscera there is no "toe-jolt" from walking, but only a "heel-jar" which does not shake them much, or require much tempering by a buffer action of the belting muscles of the trunk. Running, which taxes the heart and the lungs with much more strenuous work, also tests and trains their mutually adaptive mechanisms, as well as the mutual abdominothoracic mechanisms, in a degree not equaled in any other form of exercise. Running can be safely prescribed for any sound young man; but not for those past forty, who since they were twenty have not practised it. For him who has never missed his daily run, there is safety in never giving it up until the tardy date when it ceases to be a joy free from struggle. In our busy lives there is no systematic outdoor sport that claims less time or expense, and can bring in more all-round value for exhilaration and for muscular and organic efficiency.

Three New Death Tests are discussed in *La Clinica M. Ital.*, 1915, No. 3: (1) A drop of ether to one of the conjunctivæ for a comparative estimation of any congestive response. (2) Icard injects fluorescin under the skin, and watches for its yellowish coloring of the skin and mucosa, which is slow to develop in agony, and is absent after death. (3) Halluin introduces a stylet into the heart through a small incision; any movement of the heart is then transmitted by the stylet.

Rapid Decomposition after Burial, as illustrated by the complete skeletal denudation of the carcass of a horse within three weeks, can be achieved by the method communicated to the Académie de Médecine at its first sitting in 1916 by F. Bordas and S. Bruère. The grave is lined with straw to retain the heat from the microbial fermentation, and this is accelerated by damping the straw with cultures of the ferments of urea and by allowing some slight access of air.

PULMONARY TUBERCULOSIS.

A Study of the Importation of the Bacillus has led Ravenel¹ to the following conclusions: (1) The respiratory tract is the route followed in the majority of cases. (2) The alimentary tract is a frequent portal, especially in children. (3) The bacilli can pass through an intact intestinal mucous membrane without producing any lesion: this would occur most readily during the digestion of fats. When conveyed through the lacteals and the thoracic duct into the blood, they would be largely retained in the lungs by filtering action. (5) Infection may occur at any later age, though not so frequently as generally believed. (6) The protection of infancy and childhood is the first essential for a successful campaign against tuberculosis.

THE INFECTIVE RISK FROM CONTAMINATED BOOKS might, according to H. Kenwood and Emily Dove, be completely prevented by their exposure to moist heat for fifteen minutes. That risk, however, in the light of their experimental research published in the *Lancet*, 1915, appears to be very slight.

The Apex Localization is still attributed by C. Hart to an upper thoracic stenosis. He argues a local deficiency in the ventilation of the apex from the marked apical anthracosis he has found in some juvenile cadavers free from any tubercle. But he admits that this thoracic defect might be merely part of a general physical inferiority. The "asthenic thorax" is probably a more correct etiological designation than the "phthinoid."

The Diagnosis of Syphilis and of Tuberculosis. Calot's practical memento "Specialists of either kind should try to think more of the other kind" is reëchoed from Christiania by H. Sundt. For instance, Perthes's juvenile deforming osteochondritis is now proving to be most often not tubercular, but syphilitic; and the old-time suspicion that scrofula was a legacy from syphilis is being revived. The Wassermann test does not always identify syphilis, even when this is strongly suspected and might be identified by luetin. What of the larger field of the unsuspected and non-tested? Again, all syphilis does not yield to KI; neither is everything "syphilis" that does yield to it. Of Sundt's 22 sanatorium admissions during the last four months, 5 cases gave a positive Wassermann. He also discusses 16 recent cases illustrating an overlooked coincidence of both infections, or their reversed diagnosis. The soldier's renal tuberculosis, too, is often overlooked, according to Schneider, at a stage when its symptoms are easily mistaken for those of vesical catarrh or urethritis.

A Clinical Differentiation of Early Tuberculosis from Thyrotoxicosis is sketched by C. G. Jennings.² This is a sign of the times, an utterance

¹ Journal of American Medical Association, February 26, 1916.

² Transactions of American Climatological Association, vol. xxx

of our growing recognition that in any kind of clinical problem the evaluation of the individual thyroid factor should not be an after-thought, but should claim its place by the side of the "constitutional," nervous and organic estimate, in the forefront of our clinical investigation. The sanatorium is a fitting place for that line of inquiry, which might most quickly guide it into the neglected line of systemic therapy, to hasten the self-cure by open-air hygiene. There may be, however, "nothing distinctive in the characters of a tubercular, or of a thyroid dyspepsia." We may, therefore, conclude that the genuine value of Jennings' suggestion is for the benefit of our treatment rather than of our diagnosis.

Arneth's Leukocyte Count in the Diagnosis of Tuberculosis and Malaria. The normal formula for Arneth's five groups of polymorphonuclears (according as their nuclei present 1 to 5 lobes) is I : 5; II : 35; III : 4; IV : 17; V : 2. H. H. G. Knapp¹ reports his observation that the numerical values in that formula shift toward the left in some infections, and toward the right in others, with sufficient constancy to assist the diagnosis. In malaria (and in tuberculosis increasingly with its progress), the shift is toward the left; in leprosy preëminently, but also in syphilis, in amebic dysentery, and in ankylostomiasis, it is toward the right. The absence of any change from that normal reading would tend to exclude tuberculosis or malaria.

The Prognostic Value of the Urochromogen Reaction, which K. Schäffle had previously compared with that of the Diazo test, has recently been again studied by M. E. Cowen at the Pennsylvania State Sanatorium in 832 patients, with Weiss' technic which is as follows: A small sample of fresh urine is diluted to three times its bulk and equally divided between two test-tubes (one serving as control). To the other are added 3 drops of a 1 to 1000 potassium permanganate solution. A positive test is one giving a distinct and permanent yellow. Along with it was found to go a very strong indican reaction. The conclusions from the physical findings are that a positive reaction occurs only when a destructive tubercular process is going on; and that in an ambulant case it is a warning for absolute rest in bed. In the moderately advanced we may look for evidence of cavity formation if the reaction remains positive. In those far advanced it is of grave significance; 93 per cent. of them died within four months. A continued negative reaction replacing the positive would indicate at least a temporary retardation of activity.

The Oversight of Tuberculosis in the Aged, owing to its frequently less acute manifestations, is an insidious danger for the immediate surroundings and for the public, to which J. B. Hawes, 2d, calls renewed attention. The bacillary virulence may be much less in the bearer

¹ Indian Medical Gazette, March, 1915.

than it is likely to become after its transmission to the young. He urges that a systematic examination of the sputum of senile catarrh is an imperative duty for public prophylaxis.

The Diagnosis of Infantile Tuberculosis. Combe believes in a combination of cutaneous tests with skiascopy, both of which singly are apt to be misleading. Infants do not expectorate; and their virgin blood contains no antibodies. Mantoux's intradermal tuberculin reaction, much more sensitive and reliable than Pirquet's, is a papule ready for measurement forty-eight hours after injecting 0.1 mg. into the thickness of a fold in the skin. For six years all the children admitted by Combe have been mantouxed in one arm and pirqueted in the other. But a negative mantoux is not conclusive unless confirmed by three monthly repetitions. In miliary tuberculosis, it may be negative owing to the antibodies being absorbed by the tuberculin generated in the lesions; and intercurrent infections may act in the same way. An inspiratory tracheal stridor, or a "bitonal" cough, from laryngeal implication might assist the diagnosis.

The Skiagraphic Types of Pulmonary Tuberculosis. Walsham and Overend¹ have classified their pathological interpretations of the *x*-ray appearances. The types least conclusive for diagnosis are: the purely glandular; the simple and the disseminated type of peribronchitis; the pleuritic, and the hilum-infiltrating (central phthisis) type. I. *Tuberculosis of the bronchial glands* they find: (a) a fine shadow outside the vertebral ends of the 3d, 4th, and 5th ribs indicating swollen tracheo-bronchial glands; (b) a dim area at, or just below, the 6th right rib, continued into the hilum, localizing the infratracheal glands; (c) the normal hilum opacity is at the level of the vertebral ends of the 5th 6th, and 7th ribs; it becomes dark and broad, with circumscribed shadows; (d) isolated foci within the pulmonary fields and the apices are found in adults, often unconnected with the hilum; possibly residues of an early peribronchitis or of a localized aërogenous infection. II. *Peribronchial phthisis* implicates the lymphatic ducts as well as the glands: (a) in *P. tuberculosa simplex* the tubercles unite to small seed-like bodies, with a tendency to fibroid encapsulation; (b) in *P. tuberculosa exudativa* the bacillary process predominates; and the fibrosis is less; the nodules become larger and more cloudy, and irregularly rounded, up to the size of a cherry, but discrete; (c) in *P. tuberculosa disseminata*, there is an abundance of small peribronchial tubercles, as if from a sudden centrifugal dispersal of bacilli; (d) in *P. tuberculosa fibrosa*, or fibroid phthisis, the proliferation of connective tissue is exuberant, producing increased opacities and irregular or honeycomb-shaped outlines, corresponding to the superficial lobular divisions. III and IV. In *bronchopneumonic and pneumonic phthisis*

¹ Archives of Radiology, 1915, No. 131.

(the latter type being an extension of the other). The exudative and the disseminated peribronchitis, especially the former, lead to consolidations in the vicinity of the hilum alone, or within any of the lobes of the lung. V. *Pleuritic phthisis* cases are those of almost pure pleuritic inroad, the infection spreading from within from a superficial peribronchial focus, or to the surface of the pleura from the tracheobronchial glands; in dense fibrosis, the condition of the deeper parts may be concealed. VI. *Apical phthisis* may be: (a) peribronchial, with scattered nodules; (b) apical bronchopneumonic, with general or localized uniformity of shadow and tendency to cavitation; or (c) apical miliary; all three varieties are liable to be obscured by (d) apical pleurisy, which leads to the formation of a dense pleural cap, or of linear shadows possibly due to calcareous plates, or to atelectasis. VII. *Miliary tuberculosis* may at first be peribronchial and perivascular, but the bacilli may come from extrapulmonary situations, as in tubercular meningitis, with a generalized dissemination.

Williams' Early Diaphragmatic Sign, a diminished inspiratory descent on the side affected, is also discussed by them in the same *Archives*. The following explanations have been offered: (1) pleuritic adhesions at the apex, or perhaps at the base; (2) impairment of retractile pulmonary elasticity; (3) reflex inhibition of muscular action from mechanical irritation of some of the terminal fibers of the vagus; this might affect the corresponding half of the diaphragm, or the bronchial musculature, or possibly both; (4) the phrenic nerve fibers might be directly involved at the apex. They give the following measurements for the average normal adult. When standing, the average rise anteriorly (slightly higher in recumbency) is to the 5th rib (its upper edge on the right, its lower edge on the left), and posteriorly to the right 9th upper edge and to the 10th lower edge. But, in recumbency, the posterior rise is to the lower edges of the 8th right and 9th left ribs. Normal quiet breathing gives an extension of about a half-inch; deep breathing of about two inches. Diaphragmatic pleurisy occasions either a more prominent arch, or irregularities in it during inspiration. In children, peribronchial hilum phthisis produces a "dimpling of the hilum" from relative inspiratory inextension, most perceptible along the sternal border at the two upper interspaces. When the disease is mainly posterior, the dorsal arch of the midriff shows greater loss of excursion than the anterior.

Diaphragmatic Physical Signs in Differential Diagnosis. R. Dexter¹ points out that the cutaneous manifestation of pain from inflammation or irritation of the pleural or peritoneal surface is not so much local as referred, namely, upward along the phrenics to the 3d or 4th cervical segments, or downward along the intercostals (6th to 12th) to the

¹ American Journal of the Medical Sciences, August, 1915.

lower dorsal segments. In any downward displacements (particularly forward), each contraction is a more direct downward pull upon the subcostal angle; while upward displacements would tend to increase the normal outward movement of the lower costal cartilages. We should bear in mind, however, in the working, that mechanical contrast is largely suppressed by the fact that in both instances the contractile efficiency of the phrenic fibers is impaired, upward by passive stretch, and downward by passive shortening; while in both cases the costal arches are passively wedged apart, and more or less immobilized by the permanent pressure of any distending accumulations from above or from below.

TRACHEAL DEVIATION may result from a variety of causes besides mediastinal tumors and aneurysms. It has been looked for, and some degree of it frequently identified in phthisis by G. B. Webb, A. M. Forster, and G. B. Gilbert. It is of definite diagnostic value. It also influences our interpretation of abnormal auscultatory apex signs. As in its full development it is probably associated with dense pleuritic adhesions, they suggest that this neglected sign should not be omitted as one of our guides in deciding for or against the induction of artificial pneumothorax.

THE UNRELIABILITY OF PERCUSSION FOR APEX-DIAGNOSIS is attributed by H. Schneider¹ to the normal prevalence of a more resonant note at the left apex, and to the predominant tendency of upper scoliosis to incline toward the right. When, rarely, the scoliosis inclined toward the left, the left apex being healthy, he invariably found the left note more resonant than the right. Those observations contain the following important conclusions: (1) The first physical apex signs are to be detected by auscultation. (2) The slight dulness and retraction of the right apex, brought into prominence by Krönig, must be viewed with reserve. (3) It is never possible to exclude tubercle because the apex is neither dull or retracted; in some apical cases percussion is negative, although there is considerable catarrh of the apex. (4) Apex tubercle is, as a rule, not demonstrable by percussion until it is also demonstrable by the *x*-rays.

THE LATENT RALE (OR COUGH RALE) IN THE DIAGNOSIS OF INCIPIENT TUBERCULOSIS. H. A. Bray² states that, among early physical signs, the fine, dry, latent rale, elicited by cough, is "the one definite sign," all others being indefinite; and that localized apex rales are almost pathognomonic. He has elicited latent rales in about 75 per cent. of early cases, and in 30 per cent. of those moderately advanced. His description of their mode of production by cough, and of the best way to relieve them, is instructive. The diagram illustrates the respiratory phases, and their corresponding air-charges. Cough being obtainable

¹ Deutsche med. Wehnschr., August 15, 1915.

² Journal of American Medical Association, March 11, 1916.

at will, any stage in the complete cycle may be selected for its performance. The best stage is at *B* toward the end of expiration—with its smaller and less noisy blast, and its higher intrathoracic pressure, because its last squeeze reaches the deep-seated tubercular focus of inexpiration, and drives, he thinks, some air backward into bronchioles and infundibula, which separates their sticky walls with a click. It is a paradox that this should occur at the time when the lung is getting smaller and driving air out. But it is undeniable that with a cough uttered at that stage fine rales are often heard to follow immediately before the pause and the next inspiration. Rales do, however, also occur during the latter. These have received due attention; while the “terminal expiratory rales” have been overlooked by a faulty technic, although probably of greater service for early diagnosis.

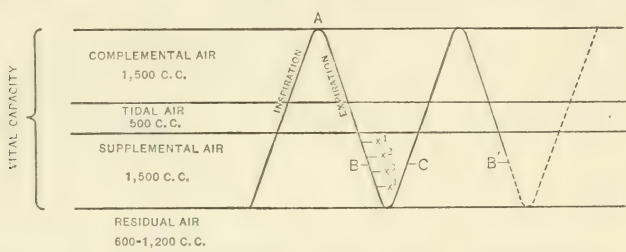


FIG. 3.—Diagram illustrative of the interpolation of the cough at different points in the respiratory cycle and the occurrence of rales following cough.

CAVERNOUS SWALLOWING, a new auscultatory sign of excavation described by F. W. Wittich,¹ would hardly have escaped previous observation were it of frequent occurrence. In future, it should be looked for. If the loud cavernous rales elicited by deglutition should be limited to a few cases only, they would be of great localizing value, as indicating that the vomica extended in the depth, and beyond the reach of percussion or auscultation, toward the mediastinal surface of the upper lobe. Wittich suggests that “empty, dry swallowing” is a better test to apply than the swallowing of water. Pulse-timed, cavernous rales heard during held breath are likewise diagnostic of their mediastinal extension of a cavity into close proximity to the surface of the heart.

The Onset of Meningeal Tuberculosis in the Adult is insidious. Sometimes its diagnosis, due to the abrupt development of effusion and of cerebral compression, is the first revelation of the existence of tubercle, particularly in the younger adults. In pulmonary tuberculosis, it should be steadily borne in mind as a possible, though unusual, complication. D. W. K. Moody² reports his observation of a striking early

¹ Journal of American Medical Association, February 26, 1916.

² Lancet, January 1, 1916.

symptom in four successive male cases: vesical retention of urine and distention, without any subjective symptoms, while the patient retains, in other respects, undiminished consciousness. He believes that this may prove to be a pathognomonic sign of considerable clinical value. Incidentally, this reminds us of Macewen's test for intracranial effusions in children, recently discussed by Wilcox, before the American Pediatric Society, 1915, which was elicited in 50 of 53 cases of meningitis, while uniformly negative in health. The stethoscope is placed on the forehead close to the root of the nose, and successive percussions by finger or hammer are practised from the parietal boss forward. The characteristic sharp, short, high-pitched, cracked-pot sound gradually diminishes in intensity as the stethoscope is neared.

Treatment. LUNG REST BY AVOIDANCE OF COUGH is urged (in addition to bodily rest) in the *Lancet-Clinic*, for November 27, 1915, by L. B. Morse. On an average, cough may be reduced at will "by 60 per cent. or more." To liquefy the sputum, he recommends hot alkaline drinks, aromatic spirit of ammonia, or fractional doses of tartar emetic, pilocarpine, or apomorphine. Tissue-rest to control the spread of infection was long ago preached by Billroth as imperative in the treatment of the accidental septic inoculations of operating surgeons.

LUNG MOBILIZATION is advocated by E. Kuhn¹ as the basis of his treatment. His mask fulfils, in a different way, the same cardiopulmonary purpose as the "expiratory bottle." The bottle offers a slight obstacle to "expiration," easily overcome by gentle blowing; a quiet inspiration then following *da se*. Kuhn's mask is more drastic. The slight obstacle it offers to "inspiration" throws the direct stress of volitional effort upon the inspiratory muscles. He has treated thousands of cases with benefit. The lungs, and the blood and lymph circulation can be exercised in that way when physical exertion is contra-indicated. In the early stage, mobilization is the most promising method. It inevitably sweeps into the blood some of the bacterial products. When this is shown by the thermometer to be overdone, he gives a period of complete rest while antibodies are being formed. The thermometer, thanks to its delicate index for toxic activities, is his trusted guide in prescribing the suction-mask at varying phases of the individual case.

THE INFLUENCE OF MOVEMENT AND OF IMMOBILITY IN HEMOPTYSIS. S. Bang's investigation of 2000 male sanatorium cases in the *Ugeskrift*, 1916, is instructive. The clock did not register any definite "hemorrhagic period" in the twenty-four hours. Many more initial hemorrhages occurred at rest than during any form of bodily exertion, even stair work. On the whole, the reclining posture gave the larger percentages. Of all movements, those which press upon the vena cava

¹ Ztsch. f. Tubs., February, 1916.

and tend to set up vascular splanchnic reflexes, should be avoided, such as sitting up in bed, bending for defecation and others. He therefore recommends half-sitting in bed as a regulation posture. Mechanically, freedom of the pulmonary circulation would be best secured by muscular activity which diverts the blood into the systemic circuit. We had often wondered that immediate stiffness and reclining do not appear to be a spontaneous and instinctive law for the hemoptoic. Bang's conclusion is in favor of greater liberality in the direction of motility and of food supply, as the immobilizing treatment has grave dangers, and worst of all in connection with the residual inhaled blood. Morphine should be entirely discarded. We may well ponder his clinical suggestions. But we must not forget that they are dated from the sanatorium, an artificial field of observation under a system of prolonged recumbencies and of a studied avoidance of all overexertion. The much larger field is outside. Its statistics should be carefully studied before we give up our rooted trust in rest.

IS THE SANATORIUM BENEFIT WASTED? Largely so in the opinion of M. Fishberg, as expressed in the *Medical Record*, for January 22, 1916, and to the detriment of avocation and reputation, for those admitted on mere suspicion, and also for many others who are curable spontaneously, and would recover without protracted occupational interruption if submitted as they are by him merely to constant supervision. He would restrict admission to active cases, with fever, sweats, emaciation, etc. This were most desirable, did the sanatorium make cures of them. Is this likely when its easier task, that of preventing all late developments, remains unachieved. Failing this, we think any such plan would be—as it has proved in the past—even more wasteful. What is needed is to elaborate our ineffective sanatorial routine into absolutely preventive and early curative methods. The public sanatorium would then fulfil its unlimited sifting and arresting purpose—by short instalments of rest and education for the greater number, and by longer cures to a finish, for the minority not gifted with self-curing capacity.

THE PRACTICAL SANATORIAL SUGGESTIONS made from Copenhagen by N. J. Strandgaard are mostly intended, to our regret, not for treatment, but only for diagnosis or prognosis. He singles out for the stethoscope a series of systematic areas, 6 in front, 9 behind, and 3 at the side; all in the sitting posture. Bang's sign notation saves more time than Sahli's, and can be learned in five minutes. Prognosis depends less even on the stage than on the original virulence and the constitutional quality. Psychological stress is not less fertile in aggravations and relapses than physical overstrain. It can also work wonders for good, particularly in the emotional sex at any age.

HELIO THERAPY has been materially advanced by H. Bordier's simple device for the avoidance of sunburn—a screen of gauze stretched on a

frame. At a suitable distance from the cutaneous surface the shadow from its threads broaden and fuse; and an even diffusion of tempered light is obtained, the dosage of which can be nicely graduated from the readings of the actinic effect obtained on sheets of photographic paper. Grangée, in last year's *Paris Médicale*, reports great success from heliotherapy in wounds. The more severe ones should not be submitted to it from the first. Others bear it well, provided they are protected from the air. Direct sunlight immediately deodorizes wounds, usually with some initial increase in the suppuration before this diminishes. The whole wounded area is exposed for a half-hour and gradually up to three hours daily.

AN X-RAY TREATMENT has been tried experimentally in rabbits by Küpferle and Baumeister, in 1913. They now report encouraging clinical results in the *Deutsche medizinische Wochenschrift*, January 27, 1916. The x-rays (in combination with the mercury lamp) are specially promising as an after-treatment after gas compression or thoracic surgery. In other cases, they have obtained 10 clinical cures and many marked improvements. The x-rays act only on actively growing tubercular granulations; not on indurations, not on the bacilli themselves, nor on any virulent destructive processes.

INTENSIVE IODINE. L. Boudreau's historical paper on the Intensive and Simplified Treatment of Pulmonary Tuberculosis by Iodine appeared in the *Journal de Médecine de Bordeaux* on January 4, 1914. His second contribution, in the third issue for January, 1916, deals with the wider scope of that method in the major infections. Its publication was intended for the same year, but was delayed by the war. Meanwhile in the early summer of 1914, a paper by the present writer, which dealt with that larger therapeutical aspect, had been communicated to a leading medical periodical. Its publication, at first unavoidably delayed, was eventually prevented by its accidental destruction before it reached the press. Its main features of difference from Boudreau's paper now under review were: Its early presentation of promising clinical results obtained from a systematic treatment, published in the *British Medical Journal*, 1914, of chronic arthritic affections by "intensive metallic iodine medication;" and the still wider estimate it took of the hitherto untried therapeutical possibilities of that method, as including not only the arthritic group and all the infective diseases, but also perhaps our other *opprobria medicinae*, namely, the severe anemias, and perhaps even cancer and other malignant growths. Any success that might attend those urgently needed trials, must redound to the credit of Boudreau's pioneer inspiration. The French tincture, like the Indian, is a pure solution of iodine, 1 in 10, in strong alcohol (95 per cent.). As it contains no iodide of potassium, the liberal addition of water necessitated by that concentration almost precipitates the iodine. This is then swallowed in a finely divided metal-

lic state. Those features are connoted in the expression "metallic iodine treatment," which I have applied to the method.

Boudreau's survey opens with the iodine treatment of typhoid. That innovation came to his notice in 1904, at the hands of Raynaud, of Oraison (B. Alpes), whose prescription was 20 to 25 drops of the tincture daily (subsequently raised to 35 drops by Arnozan and Carles, and by himself to 80; although much more than this might be required in some cases). He has had under treatment but few cases of confirmed typhoid (and none of them were fatal), possibly owing to his invariable resort to iodine at the first manifestation of any sort of infective invasion. He also believes in its efficiency as a sterilizer for typhoid carriers. Its immediate and most striking activity is to break up the "bowel-blood vicious circle" by sanitating the intestine. Unlike other chemical disinfectants, it is not toxic for the patient, but antitoxic only. Moreover, it does not try the kidney, but relieves it; it does not damage the blood but improves it, by stimulating phagocytosis, as well as the hormonal blood-regulating glands; and it is a better general and antipyretic tonic than coffee, which had been advocated by Trousseau. Typhus fever was treated some years ago, with some benefit in the Balkans by two Russian physicians, by feeble instalments (not exceeding 16 drops of the tincture per diem). Recently, in the Dardanelles, the immunity of the French troops from the infection which was rife in the Turkish lines may have been rightly credited to a prophylactic addition of the tincture to the beverages served out to them. He insists that the more trivial intestinal infections should be invariably treated the same way as typhoid enteritis, and as tubercular enteritis for which efficient treatment is attempted, by a rapidly increased iodine dosage. *A fortiori*, cholera. In cholera, remarkable results have been reported by Consoli from iodine water; by Logotheti from hourly doses of the tincture (up to 60 drops daily); and by Romano from iodoform as an immunizer. Boudreau dwells upon the equally strong indications in amebic and bacillary dysentery, and in parasitic intestinal affections in general, and ankylostomiasis in particular. A passing reference is made to the same indications in variola, varicella, measles and scarlet fever, and in erysipelas. Special attention is called to its life-saving influence in pneumonia, bronchopneumonia, influenza, and whooping-cough. For the latter, infants of three may need, and can tolerate, 40 to 50 drops daily; and children of seven up to 60 drops or more. For mumps and its glandular, and sometimes meningitic complications, iodine, he thinks, is the direct remedy *par excellence*. Diphtheria, too, cannot yet be regarded as entirely above any need for its help. He does not supply us with any clinical observations of his own in enumerating a long list of other infections. He is content to reassert under each of them his rooted belief in the antimicrobial power of intensive iodine as both directly inimical to all parasitic germs

and directly reconstructive of a germ-proof soil, and of the organic defences of phagocytosis and of blood-glandular activity. He singles out leprosy, owing to its close analogies with tuberculosis, as perhaps the most likely of all to yield analogous results when the same method is applied to it. He also points to the fact that iodide of potassium, an attenuated instalment of iodine and a definitely toxic one, has nevertheless been recognized as the only hitherto efficient medication for the control of fungous growths, such as sporotrichosis, streptotrichosis, and, we might add, actinomycosis. Among the hemotozoic infections, it is reported that, in malignant malaria, the tincture of iodine (30 to 40 drops daily) has reinforced the action of quinine; he believes it might perhaps prove a safer alternative if substituted for the latter. In sleeping sickness, an iodized salol mixture has already been used in the Belgian Congo. As regards the fulminant infections, such as puerperal fever, cerebrospinal meningitis, and tetanus, he urges that there is no internal antisepsis so likely to keep pace with the invasion as a rapidly increased and almost continuous administration of the uncombined element "*en doses mitraillées*." The subject of rheumatism is reserved for separate consideration in some future communication. It is merely stated that definite results have recently been achieved by Lasègue with high doses of the tincture, and by Moslariello with an iodide.

In conclusion, Boudreau's belief in iodine as an anti-infective panacea is only a *pium desiderium*, obviously incapable of complete realization in the face of the acknowledged occurrence of limiting idiosyncrasies. But it claims our attention to two great facts. His striking success with it in tuberculosis has been confirmed by demonstrable results extending over a period of twelve years; this is not a negligible testimony. The greater demonstration we owe to him is that of the unique toleration exhibited by the average individual for a microbicide of high potency in long-continued doses of unheard-of size (up to 400 drops daily of the Indian tincture, equivalent in free iodine to 1600 drops, or nearly 3.5 ounces of the British Pharmacopœia tincture). This is a new departure in therapeutics. It imposes upon us an unavoidable duty. No disease at present registered as medically incurable can henceforth be warranted as such until it has been conclusively proved unamenable to intensive iodine. Our responsibility is great toward each of the infections mentioned by Boudreau; although they are not all uniformly refractory to other remedies. Our responsibility is much greater toward the therapeutical derelicts for which there does not exist any efficient or safe line of medical treatment, namely, ulcerative endocarditis, the severe anemias, and the malignant new growths. Our hope may be in vain; but we are not justified in denying them the trial which is their right as an *ultima spes*.

IMMUNIZED MILK AS A PREVENTIVE AND CURE is strongly advocated by Rosenberg in the *Medical Record*, 1915. Immunized goats' milk

might be available where cows could not be kept. The immunizing technic is simple. After ascertaining by tuberculin that the animal is tubercle-free, it is immunized by a course of bacillary emulsion infections, to be followed by a continuation dose every two or three weeks. He thinks the milk then acts comparably to vaccination for smallpox, and to serum therapy for diphtheria.

PNEUMOSAN. A. E. A. Carver has recently reported in the *Lancet*, December 11, 1915, very good results in a series of 103 cases; disappearance of tubercle bacilli in 31 per cent., and marked improvement or arrest within eighteen months in 71 per cent. of the first- or second-stage cases. As no untoward effects occurred, further trial of the drug seems to be indicated.

CALCIUM LACTATE FOR TUBERCULAR BRONCHIAL GLANDS. A. Wersen¹ describes his comparative study, with the help of the x-rays, of two batches of 20 children treated respectively for two months without any lime, and with 6 to 12 gm. of the lactate daily. These large doses produced no harm but excellent clinical effects, not apparently bettered when sodium tartrate was given to some in addition. In 2 cases with protracted pyrexia, the fever yielded almost immediately to the calcium in the absence of any other change in treatment. The x-ray results were most instructive: in batch 1, even after seven months, only one definite calcium deposit, and only two intensified glandular outlines; in batch 2 (after two months), at least 12 shadow intensifications, and 8, perhaps 14, calcium impregnations. These facts tell their own tale.

EMETINE IN PHTHISIS. The *China Medical Journal* for May, 1915, contains W. H. Tatchell's account of his remarkable success with 155 emetine injections ($\frac{1}{3}$ to 1 grain daily; sometimes 1 grain twice daily) in 23 cases of phthisis. Of these, 13 were bilateral cases, far advanced or admitted into the hospital *in extremis* for hemoptysis; one lung was extensively involved in 6, and in 4 less severely. Generally, the first injection lessened the hemorrhage; the second, much more; and the dose was then reduced to $\frac{2}{3}$ and $\frac{1}{3}$ of a grain until it entirely stopped. None of them had more than 7 grains in all. One died on the second day; another on the fifth; 16 were not heard of again; 5 remained without any return of the bleeding, under frequent observation for three, up to eighteen months, and consolidated their softened areas. He concludes that emetine possesses, besides its hemostatic, some great recuperative power, probably available in a variety of diseases, including cholera and sprue. He cannot say whether it is in any degree a specific for phthisis; but in the few cases kept under observation the bacilli disappeared.

¹ Upsala Läk. Förh., December, 1915.

The Risks of Emetine are largely traceable to the varying toxicity of its commercial samples. The same was formerly true of aconitine. But, in addition, Levy and Rowntree¹ pointed out that the maximum toxic effects are apt to be deferred for some days after stopping the supply. Again, some of the symptoms closely resembling those of dysentery might be mistaken for mere exacerbations, as in a man whose skin was injected in twenty days with a total of 29 grains. His moderate diarrhea was first checked, but afterward seriously intensified, not ceasing until five days after the last injection. He died five days later from bronchopneumonia.

LACTIC ACID INTRAVENOUS INJECTIONS. Brilliant bactericidal results in early cases are claimed by Jessen for a 1 per cent. solution injected once a month, or as often as twice a week. The treatment is not well adapted for advanced cases, as it might liberate endolysins on a dangerous scale.

ARSENIC AND ITS COMPOUNDS do not possess any germicidal action on Koch's bacillus. That is the upshot of A. Arkin and H. J. Corper's valuable experimental inquiry in the *Journal of Infectious Diseases* for April, 1916. They have further established that sodium stannate is also ineffective, even in concentration. The preparations investigated included sodium arsenite and cacodylate, atoxyl, arsacetin, neosalvarsan, and lastly mercury cacodylate, which alone is germicidal for human tubercle bacilli *in vitro* (down to 0.001 per cent.) presumably by virtue of the mercury. Administered parenterally, they all lead to a fairly uniform visceral distribution of arsenic in the liver, lungs, kidneys, spleen, blood and tuberculized glands. It would thus appear that the clinical value of sodium cacodylate in phthisis is mainly due to general metabolic activity of arsenic.

QUININE AND UREA BICHLORIDE is recommended for trial by Myer Solis Cohen,² not as a specific, but as checking the fever and toxemia, in capsules of 3, 5, 7, 10 or even 15 grains once, or up to four or five times daily, according to tolerance. It may fail completely, but sometimes gives brilliant results. He has also found it effectual in pneumonia and other infections.

"TO WINTER IN THE SOUTH, or at HOME IN A NORTHERN CLIMATE" is a question more easily answered for arthritic than respiratory ailments. In both instances, longer hours of outdoor life are a positive gain for the general health and strength. Arthritics with sound lungs reap that advantage, in addition to the best climatic conditions for their articular cure. The same undoubtedly applies to bronchial groups of pulmonary invalids. Through inevitable confinement indoors during the severity of a northern winter they stand to lose more vitality than intermittent bracing influences can develop in them. The best

¹ Archives of Internal Medicine, 1916.

² New York Medical Journal, February 26, 1916.

helps for their bronchial weakness is a sustained immunity from any bronchitic attacks: their lungs and heart are stronger in the end for not undergoing the risks of a hardening climate. Pulmonary tuberculosis is on a totally different footing. Vital resistance is everything for its bronchitic and its pneumonic developments alike. But, in the selection of climates or of sanatoria, the fact is too often overlooked that the essence of the cure is that there should be an unobstructed way for the "open air" into the depth of the diseased lungs. Failing this, the stillest and purest cold Alpine air is in vain; nay, if too cold, it may be disastrous. Some consumptives are gifted with great bronchial tolerance; many others with a great sensitiveness which perpetuates the obstructive catarrh and favors the spread of the bacillus, unless the irritating coldness of the dry or of the damp air be tempered to their susceptibility. They might be better off at home. Under its less rigid rule, they might safely enjoy instalments of benefit both from protective artificial warmth, and from a graduated training to endure more and more of the vitalizing harshness of a northern climate. Chronic catarrh is their greatest enemy.

THE PLEURA AND MEDIASTINUM.

Eosinophilia in a Postpneumonic Pleural Effusion (with 45 per cent. eosinophiles) is reported in the *Johns Hopkins Bulletin* for January by Bayne-Jones. The 8 cases summarized from literature bear out the assumption of a local derivation (rather than from bone-marrow), such as Schwartz has endeavored to trace to some eosinotatic, protein-derived substance, likely to be generated in any exudates undergoing slow absorption.

The Methods of Dealing with Pleural Effusion are briefly reviewed in the *Therapeutic Gazette* for March, 1916. The routine of aspiration for clear fluid, and that of rib-excision for pus are instances of our conservatism. Neither of these procedures is generally necessary. Clear fluid can be removed by siphonage; and, if it be merely a transudate, nothing more may be required. The distinctive test for an exudate (an inflammatory secretion), in addition to a specific gravity of 1018 or more, instead of about 1006, is the trail of cloudiness following a drop of it when dropped into 3½ ounces of water acidulated with 2 drops of glacial acetic acid. Exudates are apt to recur. To obviate this, Gilbert developed, in 1894, his method of autoserotherapy. The subcutaneous reinjection of 5 or 10 c.c. of the exudate as soon as some of it had been drawn from the pleura into the syringe, was found by him to favor reabsorption and sometimes to supersede the need for tapping. Many confirmatory statements from others suggest that its curative scope ought to be given a fair trial.

Empyema Curable by Lavage Instead of Operation. Erich Leschke¹ describes his successful technic for the simplest of all curative methods, that of evacuation and sanitation through two cannulæ instead of an incision. This had been attempted long ago, but with an inefficient method. Hence the prolonged monopoly of the surgical mutilating cure by free incision with costal resection. This may probably continue to be indispensable in a small minority of cases. The difficulty had been to evacuate the fibrin through narrow tubes, and to prevent their blockage. Perflation, an early and faulty anticipation of our more careful inflations for the induration of pneumothorax, had been originally intended by the writer to overcome that obstruction; but it was given up owing to the universal adoption of a wide outlet for drainage. An instalment of pleural lavage through the surgical window was practised by some surgeons as part of their operation; and sometimes in their after-treatment. The principle of a systematic, continuous through-irrigation, the missing factor in the old cannula technic, was, however, soon after utilized by me for the medicinal treatment of the peritoneum in ascites. Here that mechanical difficulty did not arise. Medicinal injections into the pleura after partial evacuation of simple effusions, to promote their complete absorption, was another development of the same idea.

Leschke's recent empyema technic is based upon the principle of free irrigation as a means to the gradual fragmentation of the fibrin. Through both cannulæ (inserted into one of the lower interspaces under local anesthesia) he introduces an india-rubber catheter provided with lateral perforations near the tip. One cannula is connected up to a normal saline irrigator; the other is for siphonage, and is prolonged into the fluid of a previously charged receiver. The fluid pus is then siphoned out. If any fibrinous plugging should occur, a large suction syringe has to be used; or the irrigating current has to be reversed. Two or three quarts of saline may be passed through at each of the first sittings, carrying away an abundant sediment. The irrigation should be repeated three times daily at first; afterward less frequently, according to indications. As the lung reëxpands, the catheters are gradually withdrawn (they are to be clamped and disconnected during the intervals). Cicatrization occurs after their final removal; leaving an *unimpaired chest and lung*. The successful applicability of this method, clearly established by Leschke for a limited range of cases, seems to open up greater possibilities. When dealing with fluid pus only, it fulfils its object in a few days. A like rapidity is not attainable in the fibrinous cases with heavy membranes. But rapidity is not indispensable, if any unavoidable prolongation of the treatment should be free from septic risks. In reality each lavage leaves the pleura

¹ Berl. klin. Wchnschr., May 24, 1915.

cleaner and more prone to shed its pyogenic membrane. Therefore, there need be no anxious time limitation. The more we wash, the easier the shedding of the membranes, and their melting away under disintegrating hydration. On that principle we may assume that the refractory group unamenable to the method may prove to be a dwindling and perhaps a vanishing one. If so, a great step will have been taken toward the solution of the all-important question recently raised in a preliminary report by J. H. Pryor,¹ of Buffalo, which we may briefly discuss.

Immobility of the Diaphragm following Pleural Exudates. Pryor's 83 cases were x-rayed by experienced experts after a varying interval of nineteen years down to one month after the pleural trouble (47 empyemas, 16 serous pleuritis, and 20 serous pleuritis in tuberculosis). Unilateral immobility remained complete in 63 per cent. of them, or partial in about 20 per cent.; only in about 20 per cent. the function was unimpaired. Space limits us to the practical issues in etiology, prevention, and treatment. No fresh practical conclusions are offered in addition to the old precept "*principiis obsta*" for the earliest removal of any collection, whether purulent or serous. But an opinion is advanced that adhesions play a secondary rôle (of unascertained extent); and that "they attack a part of the diaphragm already entirely or partly paralyzed." The hypothesis is also submitted "that gradual paralysis of the phrenic might be induced progressively down its course along the pericardium, to the under surface of the diaphragm, and through the phrenopericardial ligament." At the same time muscular disuse and chronic inflammatory changes are not lost sight of. They remind us strongly that the key to the situation should not be sought anywhere, except at the earliest stage of the trouble. Long ago I came to the conclusion that posture is an indispensable early factor for the success of the evacuant treatment. The diaphragm contracts only downward. Short of an inbending of the ribs it can only contract, if the lung by expanding will permit it to descend; or, failing that expansion, if more fluid can be sucked into the pleura. The inherent fault of the surgical incision is that it opens up the cylinder of the diaphragmatic pump and destroys its working. Hence a greater call upon the collateral expanding force of the ribs, and a necessity that it shall not be impeded. But the early treatment of empyema and of pleurisy is in bed. The unyielding resistance of the mattress sets up a "postural" obstacle to the thoracic pumping. I had to devise special empyema mattresses to combine, if possible, the two mechanical essentials, otherwise incompatible, of a dependent position to drain the abscess, and of freedom from lateral pressure to allow free costal expansion. They did not prove satisfactory. Moreover, for simple pleurisy

¹ New York Medical Journal, April 22, 1916.

and its convalescent stage, provision had to be made for a varied postural and respiratory exercising for the abdominal mechanisms as well as the thoracic. Pryor's paper fully demonstrates the importance of the latter. "Postpleuritic laziness of breathing" was the inclusive name I had given to the pleuritic sequela he seeks to explain. Its remedy seemed to be in an *early reactivation* of the lazy side by decubitus, in advance of any later postural respiratory exercises out of bed. But in empyema the more difficult task was to counteract by early thoracic and pulmonary reëxpansion the disablement from the maiming cure by resection. This led me to resort to the hammock as a comparatively yielding support for the weight of the body, relatively adaptable to varying purposes by varying its mode of suspension. The original method, published at the close of the century, stood for that principle, without the elaboration which better engineering might yet provide for it. It has hitherto failed to be submitted to the improving test of multiplied individual experimentation. A new field might be opening for it under Leschke's technic, which so greatly simplifies the empyema cure. It is enough to suggest that considerable working efficiency would accrue from adding to the variable "polar" suspension of the hammock a multiple, easily regulated, "lateral" suspension from a light iron frame fitted with suspending straps. This would convert the hammock into an adaptable and yielding cradle. And it would still be capable of any further improvements which its trial might suggest.

Artificial Pneumothorax. The capabilities of the method are great. Copied from nature's management of intrapleural pulmonary perforations, traumatic or pathological, with minimal damage to healthy structures and functions, it stands out in sharp contrast with the "slow process" of wearing down tubercle by raising the vitality or perhaps aiding the *vis medicatrix* by chemical or antibacillary therapeutics; and it contrasts not less sharply with thoracoplasty and with resection, which take the risk of irrevocable interferences with the structural and functional integrity of the chest. Taking that risk, and when it eventuates in success, their achievements in late cases are more thorough and rapid, as recently reported in several striking instances. But it is not surprising that the profession should still cling to Forlanini's less heroic method which is further discussed by Otis, Adelung, and others. The paramount question is as to its scope for an earlier, or for a later resort than heretofore. We still shrink from the temptation, by no means irrational, of using it quite early in unilateral refractory cases, as a quasi-physiological method of nipping phthisis in the bud. That hope is encouraged indirectly by Adelung's successes in bilateral cases. They demonstrate the possibility of safely compressing both lungs in succession or even simultaneously. This leads him to estimate that our irreducible physiological requirement in working pulmonary tissue might be as low as one-sixth of its normal supply. The

physiological risk being so small, we may probably lose our diffidence of an early unilateral compression as soon as a technic can be devised practically free from operative risks. So long as we relegate it to lateness, it must remain a "*pis aller*," calling for considerable improvement, or to be improved away. At the present stage of our pathological knowledge and sanatorial equipment, no average cases (exclusive of the fatal primary miliary invasions from massive blood infection) should be allowed to progress till heroic surgery is their only appeal.

Pulmonary Thoracoplastics versus Pneumothorax. This vital issue in life-saving phthisis surgery will prove, when the facts can be published, to have been vastly forwarded toward practical conclusions by the unlimited variety of the traumatic *experimenta belli* in the battlefield, and by the experience gained at the base hospital in their conservative surgery. Until then, it would be premature to reopen any discussion. *Omnia jam fiunt*. It is enough to state that surprising results are rumored from the front to the credit of *nil desperandum*, when heroic measures are favored by sound flesh and blood. It may be that their indirect influence will tell in two opposite directions. Artificial pneumothorax may be greatly encouraged for wider practice in the safe and promising early stage of pulmonary tuberculosis which we might term the "physiological stage." On the other hand, it may be relatively discouraged in favor of more drastic measures in the late pathological stages, where the structural conditions are increasingly adverse to the safety, to the efficiency, and to the ultimate success of its essential mechanical purpose, that of inducing complete collapse of the diseased pulmonary districts.

The Remarkable Tolerance and Healing Power of the Lung, Revealed by Recent War Surgery for Intrapulmonary Projectiles, which was under discussion last September at the Société de Chirurgie, has its bearing upon artificial pneumothorax. Prior to June, 1915, Marion was the only French surgeon who had extracted projectiles; and his work was unpublished. His success emboldened him to adopt a summary and primitive method, that of digging out the projectile with the fingers, after preliminary resection; the lung having been fixed with catgut stitches before opening the pleura. P. Duval severely criticized that lacerating method. His own technic is to open the pleura for a progressive and total pneumothorax; to palpate, draw out, incise, and subsequently suture the wounded lobe; and to completely stitch up the chest, so that the intrapleural air can be immediately aspirated by puncture. Only one death occurred in 20-odd cases (from double pneumonia, the projectile having lodged close to a pleural adhesion). P. Maclaure, on the other hand, thinks that pneumothorax might be avoided by a smaller pleural incision. Duval's patients were up and about in a week, and completely cured in a fortnight.

Thus, while Carson's cure had to wait sixty years for the discovery

of its "injectional" modification, after nearly one hundred years results are justifying the fulness of his belief in the simple "incisional" method for the treatment of congestion, of hemorrhage, and of trauma (though we cannot share it in connection with phthisis which was an afterthought of his). It might almost be predicted that artificial pneumothorax will survive as an every-day resort in pulmonary surgery, long after its use in late consumption will have been superseded by an early cure. Indeed that fulfilment is already with us. H. Ehret, in the *Münchener medizinische Wochenschrift*, ascribes his unbroken series of 100 recoveries from gunshot wounds of the lung to his practice of puncturing the chest and letting in air, as the best means of expelling all secretions, and of preventing bleeding and the tendency to adhesions. Again, Rose Bradford,¹ in his remarks on hemothorax, mentions that sudden alarming and fatal symptoms which had been attributed to secondary hemorrhage were eventually traced to infection with anaërobic, gas-producing organisms; and that these cases, when they are recognized, and the pleura promptly opened and drained, recover in an extraordinary way. Other patients, too, developed under the anaërobic infection "cracked-pox" and "bell" sounds, liable to be mistaken for those of a "simple" pneumothorax. Their mortality was much reduced by prompt pleurotomy, resection, and drainage.

Artificial Inflation for the Cure of a Spontaneous Pneumothorax. Morelli published, in 1911, four successful applications of his new method. It is obviously rational. A. Pisani² reports from Rome his own success in a case of unilateral excavation. An alarming, spontaneous pneumothorax had supervened during his performance of the usual inflation. Air had to be immediately aspirated out. But it kept reaccumulating, and had to be aspirated daily by puncture. After nine days of this, Pisani adopted Morelli's method, and injected 800 c.c. nitrogen, raising the pressure from minus 5 to plus 11. The spontaneous leakage stopped immediately and the patient did well.

Vrooman asserts that for any good pneumothorax results the cases must be of recent origin. Unilateral cases, when after six months, they are still rapidly progressing and already far advanced, are the most urgent, and not the least promising. Severe incipient hemoptysis should also be operated at once. But as he could not advocate operating on all incipient cases, this treatment has been restricted to 5 per cent. of his patients. C. Ferreira, of Buenos Aires, derives, from the study of numerous statistics, a conviction that the percentage of radical improvements is decidedly limited. He warns against the abuse of the procedure, and our disregarding Forlanini's own list of limitations. R. Burnand, of Leysin, takes an optimistic view, from a consideration of the late results, and of his observations in about 100 cases. He does

¹ Lancet, January 29, 1916.

² Gazzetta, 1916.

not operate in any case deemed curable by other means. Neither does he refuse to operate because of an extension of the disease to the other lung. "No remedial measure can show so good a record of rescues, of half-cures, or of permanent cures." J. R. Littlefield¹ narrates the remarkable arrest of an hemoptysis (from a large unsuspected vomica) refractory to all other means employed. The operation was performed with an elementary improvised apparatus.

Partial Compressions, Combined with a Negative Pressure in the Pleura were described by P. E. Livierato in the *Riforma Médicale*, 1914, as of distinct benefit in interrupting the lymph current from the lungs to the pleura. The lymph thus dammed back in the lung, together with pus and other toxic substances, acts by way of autoserotherapy.

Saugman's statement before the London International Congress is worth recalling. Excluding hopeless cases, 100 suitably selected patients were operated. The operation was effective in 64, and a failure in 36. The comparative clinical results in the two sets are tabulated as follows:

	Pneumothorax effective (64).	Pneumothorax failed (36).
Able to do ordinary or lighter work	32	8
Unable to work on account of tuberculosis	18	12
Dead from tuberculosis	12	14
Unknown	0	1
Dead from acute complications	2	1

OR STATED IN PERCENTAGES:

Able to work	50.0	22.2
Unable to work	28.1	33.3
Dead from tuberculosis	18.7	38.3
Freed from tubercle bacilli	50.0	8.6

The observations were made under the same sanatorium conditions; their significance is great.

Phthisis Surgery in Cases of Valvular Defect need not be absolutely excluded, according to H. G. Wetherill, of Denver. In view of its life-saving capabilities, he has never withheld it; and has had no cause for regret. He points out that the altitude gives it a better chance than humid or torrid plains. May we add that it provides also a safer selection of clinical material; those who can reside at Denver must be the subjects of greater valvular loudness than damage.

THE RESPIRATORY AND PULMONARY AFFECTIONS.

Air-poisoning in Warfare. The ancient Greek-fire, invented in the fourth century, was obtained from the ignition of a mixture of pitch, resin, asphaltum, or petroleum, sulphur, quicklime, and probably salt-

¹ Journal of American Medical Association, January 8, 1916.

petre. Since the discovery in France, in 1870, of the fulminant potassium picrate as an available weapon, modern chemistry has developed that ancient idea into an art, and has supplied an assortment of lethal vapors rendered portable by liquefaction. Among them a selection was made of chlorine, bromine, formol vapor, nitrous fumes and sulphurous anhydride as the most irritant and easily managed products; chlorine was found to be the most efficient of all, one litre of it rendering 70,000 cubic feet of air irrespirable (1 per cent. highly poisonous; 5 per cent. deadly). The immediate effects (as from bromine) are intense dyspnea and irritation of the eyes and of the respiratory mucosa, with cough and spasm of the glottis, blood-tinged mucous flow, suffusion and cyanosis, bloody urine, sometimes vomiting of blood, and every degree of prostration down to complete asphyxia. The early results are often fatal, through fluid or spumous bronchorrhea, or intense bronchitis or bronchopneumonia, or pulmonary congestion developing into massive pneumonia and sometimes gangrene. Transient hemoglobinuria, persistent hematuria and albuminuria, and often biliuria, massive degeneration of the liver, spleen and kidneys are among the postmortem appearances. The late results are severe bronchopulmonary disablements of slow recovery, or never to be completely recovered from. The only efficient protection is that of an excluding mask provided with a moist gas-absorbing and neutralizing respirator charged with a chemical solution such as that prescribed by the Académie (Na-hyposulphite 1000 gm., Na-carbonate 500 gm., glycerin 150 gm., water 800 gm.).

THE PATHOLOGY OF FATAL CHLORINE INHALATION IN ANIMALS is discussed by Sir E. Schafer in last year's *British Medical Journal*. Its mechanism is not bronchiolar spasm, but alveolar blood stasis; with considerable interstitial edema, which aggravates and tends to keep up the capillary obstruction. Otherwise, the tissues present normal appearances. The bronchial epithelium is well preserved, and the mucus not much increased. He found that a preliminary dose of atropine did not prevent death or delay it, showing that this is not primarily due to bronchial obstruction. The heart remains feebly excitable for some time after death; its right side is overcharged, but not so much distended as in ordinary asphyxia. The liver and abdominal organs are not much congested, and the intestines usually bloodless, although the veins at the back of the abdomen are full. The effects of bromine, much more irritating to the conjunctiva, are less damaging to the respiratory tract, and less rapidly fatal.

THE PATHOLOGICAL EFFECTS OF ASPHYXIATING GASES. I. T. Pojarisky, in his study of 40 cases in the *Russky Vrach.*, 1915, No. 28, describes severe blood-vascular changes as well as the pulmonary. The latter complications may evolve after three days in the shape of putrid bronchitis, gangrene, pleurisy, or pulmonary embolisms and

infarcts. After asphyxiation, the earliest changes within twelve hours are edema and partial atelectasis. The blood-vascular changes, which result in a thrombotic obstruction of the circulation (including often miliary cerebral hemorrhages), and in great strain upon the heart, he localizes chiefly in the endothelium, and in the blood plates; both favoring hyperinosis, and the formation of adherent white thrombi. Death had occurred in 6 cases after twelve to thirty hours; in 20, after two or three days; and in 14, between the third day and the eleventh day.

CHLORINE INHALATION AND PHTHISIS. Is chlorine gas poisonous? Both Cl and SO₂ in moderation seem to be more harmful to vegetable than to human life. Christison had noted that in chlorine factories the workmen are healthy and often long-lived. At Belfast they remained immune from the epidemic fever of 1816-19. T. Aitchison has reported to the *Lancet* on September 25, 1915, similar testimony from the Tyneside bleaching powder factories. He knows of only one death, that of a man in alcoholic coma. Another man, cyanosed and unconscious from a massive inhalation, was saved by a penknife tracheotomy, and was well the next day. Long ago his father often prescribed for those threatened with phthisis to work at bleaching powder chambers, finding that they got well. On the other hand, nitrous fumes are highly poisonous. Chlorine workers acquire a remarkable tolerance for concentrations which set up glottic spasm in the untrained.

THE IMMEDIATE TREATMENT OF ASPHYXIA FROM "GASSING" should be energetic. It is well planned by Rathery and Michel in the *Paris Médical*, for October, 1915. Cardiopulmonary relief should be at once given by bleeding, or wet cupping; and stimulation, by strychnine and sparteine sulphate injections in camphorated etherized oil. Subsequently, dry cupping and mustard poultices to the chest. Much comfort and protection from congestion and bronchitis are obtained from the wet pack renewed every three hours. The cough is difficult to check; but some alleviation is derived from Eucalyptus inhalations and from belladonna and aethone, a fluid preparation (obtained from a mixture of alcohol and chloroform by the action of sodium) of much use in 20-drop doses for bronchitis and laryngitis. Subcutaneous oxygen is specially indicated, and most effectual. No apparatus is required (other than a gas balloon and a filtering cotton plug) for the injections, renewable three times daily, preferably in the hip region. A milk diet is the best. Adrenalin can be injected or given in capsules. Cacodylate injections promote the convalescence, which is inevitably slow.

Leonard Hill¹ thinks that the essential indication of clearing the airway should be attempted by the inclined prone posture, by artificial

¹ British Medical Journal, December 4, 1915.

respiration with frequent oxygen supply, or, if possible, by the compressed-air chamber (two atmospheres of pressure); and, in the less severe cases, by emetics. Atropine has not proved equal to expectations in bad cases; and no efficient prophylaxis has been discovered against the onset of pneumonia.

THE TREATMENT OF ASPHYXIA FROM NITROUS FUMES, as adopted (for somewhat similar symptoms) in the mines of the Witwatersrand, is described by Watt and Irvine.¹ Free emesis is secured as a first essential by copper sulphate (8 grains) in water, or by apomorphine injection. This may prevent further trouble if rest be enforced. But if dyspnea and cyanosis, with basic râles, should develop, a pint of blood should be drawn from the arm. The blood is apt to be tarry and rapidly clots. It should be treated by a preliminary saline infusion. Atropin *sub cutem*, and oxygen to inhale are indicated. Recovery is exceptional when the onset of general pulmonary edema cannot be suppressed.

The Aviation Syndrome, as described by G. Ferry,² includes, for ascents up to 2500 meters, headache, tinnitus, and labored inspiration. During the descent, the headache passes off at a lower altitude than that which produced it; respiration becomes easier; but the tinnitus persists after landing for one-half up to four hours, according as the motor was situated anteriorly or posteriorly in the *aéroplane*. The symptoms of nervous excitation (tremors and twitchings, slight incoördination, short spells of palpitation, facial flush, vesical stress in the absence of any distention, craving for food, etc.) soon make way for fatigue and imperative somnolence. The pulse rate rises by 19 to 21 beats at 1500 meters; and does not completely slacken during the descent, retaining an increment of eight to fourteen beats on landing. Ferry attributes the syndrome to combined heart fatigue and fall in blood-pressure, with transient anemia of the brain, rather than to changes in the semicircular canals. Aviation should be forbidden those with any cardiovascular inferiority or abnormality, howsoever trifling. Any visceral affection or congenital taint should also be carefully considered before admitting candidates to the training school.

Submarine Perils and Fatalities. W. H. Halsey reviews the entire subject of Submarine Casualties in the *Military Surgeon* for January. Its clinical pathology is that of the worst conditions for the spread and the intensification of infective diseases of all kinds. Its accidental pathology is made up of constant physiological, traumatic, and toxic risks special to each of the phases of submarine life whether at the surface or submerged, at rest or under way, quite apart from any explosive catastrophes, either spontaneous or in action. The nervous tension is perpetual and maximal for each and all; and any

¹ British Medical Journal, 1915.

² Presse Méd., February 14, 1916.

individual psychic breakdown tells with unparalleled intensity upon the moral of the closely confined, nerve-racked crew. The obsessing thought is that of suffocation, but toxic asphyxiation is also a perpetual and more varied danger. The asphyxiating gas may be CO_2 , HCl , Cl , gasoline, or the fumes from the oil used as fuel. The generation of HCl or Cl may result from a leakage of sea water into the battery tank and the electrolysis of NaCl . Gasoline vapors, burnt or unburnt, are less irritating and deadly, and the gasoline engines are used only on the surface. But the insidious onset of its neurotoxic effects culminating in wild delirium and profound coma is a formidable possibility. It may rapidly involve all the men in a compartment, necessitating a speedy ventilation of the boat. Summer heat is intolerable in tropical waters, and in the arctic winter the crew is periodically exposed to benumbing cold. The wonder is that men can be found equal to the physical ordeal, and that they should endure it with unflinching courage and uncomplaining cheerfulness.

The Mechanism of Pulmonary Edema has recently been studied by Y. Matsuoka¹ with the help of Starling's "surviving heart-lung" preparation, instrumentally aided in the lifelike upkeep of its blood and air functions. He states that the main effect of obstruction at the root of the aorta is pulmonary edema, not infarction. Pressure is raised in the pulmonary vessels and right heart, and transudation occurs as a result of passive capillary dilatation. The edema greatly reducing the gaseous metabolism and energy supply of the heart, complete stoppage soon follows. Clinically, oxygen is indicated. But, in order to give it full effect, its inhalation should be preceded whenever possible by a venesection, to unload the congestion and clear the air-way.

"Edema Disease," rife among the underfed and overworked prisoners in Germany, is attributed by Jürgens² to a relative deficiency in the diet, either as regards quantity or completeness. It is a deficiency disease like beriberi; not, as was thought, an after-product of various infections. In camps where the three nations were represented, the British seemed to suffer most, the French least. On the whole, the Russians contributed the highest percentage. It was easily cured by varied and more abundant diet. Besides edema and pain in the feet and legs, the symptoms were: progressive debility, the apathetic aspect of exhaustion, flabby, yellowish skin and pale mucous membranes; and, at a more acute stage, sudden swelling of the face and lips, a tendency to scurvy, and serious bowel disturbances.

Air-borne Infections. F. H. Thomson has published his conclusions from three and a half years' clinical observation. Scarlet fever and diphtheria are not conveyed by the air, chicken-pox and mumps most probably not, but whooping-cough is certainly air-borne, in some cases,

¹ Journal of Pathology and Bacteriology, 1915, xx, 53.

² Berl. klin. Wehnschr., February 28, 1916.

though rarely after the third day. Its transmission could not be traced to contact after the eighth day. A knowledge of these facts might modify our practice as to isolation, and save much unnecessary expense.

Principles of Treatment in Pulmonary Engorgements. The *Therapeutic Gazette* for March contains interesting articles on the Treatment of Pneumonia by W. P. Northrup, H. Brooker Mills, and H. Amory Hare. They claim a full recognition for the great therapeutical principle of "cold, fresh air" which we owe to Northrup's advocacy. Granted that due respect be paid to senile bronchial susceptibilities, it is a prescription to fit every case and every stage. Another more recent, no less important, cardiopulmonary prescription of wide applicability has likewise been copied from the respiratory therapy of phthisis, namely, the postural. We have been wisely warned, as students, against raising the pneumonic patient for examination. Our teaching of today has not universalized the other life-saving clause—that they should not be allowed to lie flat, for mechanical reasons of respiration that need no expounding. The treatment of all pulmonary engorgements is by definition postural, but the posture is not for all patients to be uniformly seated bolt upright. Other major principles there are which are no less stringently applicable to every case of engorgement (pneumonia is potentially of that order), when associated with microbic infection. One of them is "antibacterial"—by antitoxin, by vaccine, or, as in syphilis, by the best chemical bactericidal drugs, be it "galyl" or "intramine." All syphilitic patients are thus entitled to the same remedy, the reputed "best." The other is "cytophylactic," to support to the utmost the reactive power of the circulation, and in particular of the phagocytic function. That indication is invariable, but its mode of application has to be varied for each individual and not sweepingly generalized to all. The heart, being depressed by poison, is in that measure failing. It has to be insured by timely help ahead of any manifest failure, which once declared, is too often irremediable. The indication shared in common by pulmonary congestions and edemas is to mobilize the stagnant blood, and for this bleeding or leeching are unanimously viewed as a sovereign remedy, seldom contra-indicated. For the primary pneumonic congestion, however, that indication has hardly received any recognition from our clinical authorities. Although it is admitted that the late and fatal secondary congestion and edema never occur except after a preliminary consolidation, not a few fail to draw the conclusion that there must be some evil in the latter and in the congestion which causes it. So profound a pathological change cannot be a cypher or of neutral significance. The consolidation must be either beneficent or harmful. According to one or to the other interpretation, the blood should either be encouraged to clot; or on the contrary, seeing that it is hyperinotic, discouraged by every means from clotting, and by every available means liquefied again if beginning

to clot. Practically, as patients die in proportion to the extent of the consolidation, any remedy proved to be harmless and preëminently active in aborting so dangerous a development, should be a universal resort. Yet that pivot question is not faced at all by the majority of recent clinical papers on pneumonia. The alternative "clotting" treatment has not been pushed beyond an occasional recommendation of calcium, because none have made bold to recommend the consolidation of the lung as a set purpose for our treatment. Meanwhile a minority are strenuously working at aborting the pneumonia by aborting the consolidation. That minority is made up of two groups; some resorting to vaccines, the others to drugs. Both claim separately considerable success. This should give the profession much to think about, as, conceivably, their combination might beat any separate record. But it should first clearly make up its mind that it is as desirable and legitimate to abort or disperse a consolidation as it is admittedly dutiful to abort or disperse a congestive or edematous engorgement.

The Treatment of Bronchial Affections is dealt with by L. Hofbauer in an important paper in the *Therapeutische Monatschrift*, May, 1915. He endorses Singer's method of restricting the intake of fluid and of prescribing calcium in the absence of any renal trouble or tubercle. The fluids are gradually reduced to 400 or even 300 c.c. daily, but allowed freely every fourth day; thirst being meanwhile relieved by slices of orange or of lemon. Under this, the body weight may increase in a few weeks by twenty-two pounds or more. Mouth-breathing is often at the root of chronic bronchitis; and tying up the jaw at night is an effectual, though unpleasant, remedy. Hofbauer substitutes for this a systematic training in nose-breathing with the help of an automatic device which starts a flash of light whenever air passes through the lips. He also recommends iodine medication to liquefy the dried secretions of mouth-breathers. In asthmatics, epinephrin relaxes the spasm, though it is inactive upon normal bronchi. Meyer has also used calcium salts with success to allay nervous irritability (calcium chloride 20 parts, syrup 40, and distilled water 200 parts). An important causal treatment by systematic expiration is based by Hofbauer upon Löwy's observation, confirmed by others, that vagus irritability rises with the amount of air in the lungs. His "Summtherapie" is a practical application of the indication to lessen their average expansion, and he uses a special device, his "expirator," to favor expiration.

Potassium Iodide in the Acute Respiratory and Circulatory Affections. A. Baginsky deplores the practical disregard of his persistent advocacy of the iodides based upon the evidence of clinical results. The remedy seems to act directly upon the tissues and circulation, particularly those of the serous membranes. It is especially effectual in the endocarditis, pericarditis, and polyserositis consecutive to acute articular rheumatism. Why not then draw the practical conclusion, long taught

by the present writer, that threatening or actual rheumatic fever should immediately be treated, not with salicylates, but with the iodides? Baginsky's dosage for children varies from 1 to 3 grams daily, in frequent doses. He instances, among others, a case of acute pericarditis manifestly bettered by three-hourly doses.

Vaccines for Respiratory Diseases. R. J. Rowlatte's report on 14 cases in last year's *Lancet* is encouraging, 10 of them proving satisfactory. The 4 refractory cases were inveterate, nasopharyngeal catarrhs previously treated surgically. In the aggregate of 5 microcatarrhalis infections, 3 were cured, 1 benefited, and 1 unaffected; 2 pneumococcus cases were both cured, also 1 staphylococcus, and 1 of *S. aureus*; 2 of mixed staphylo- and streptococcus got well; 2 out of 3 streptococcic cases recovered, the third being unaffected.

Autotherapy is a safe cure, according to C. H. Duncan. One dram of the sputum is to be shaken in a 2-ounce bottle with 1 ounce of distilled water, and, after twenty-four hours, filtered through a Berkefeld. Of this, 20 minims are injected into the cellular tissue over the biceps. Usually this cures an *acute* or *subacute influenza* in twenty-four hours. The dose should not be repeated till the patient ceases to improve. In chronic cases, or in debility, smaller injections are indicated.

Bronchospasm and its Treatment. N. von Jagie extols epinephrin, a sympathetic stimulant and a vagus depressor, for its amplifying effect upon the excursions of the diaphragm. This has led him to use it in various dyspneas, and in emphysema. Strasburger asserts that it reduces mucous secretion from the intestinal membrane; possibly then also from the bronchial. In primary emphysema the greatly diminished diaphragmatic range is increased, and the associated bronchospasm, whatever its etiology may be, is allayed. The positive aldehyde urine reaction is then changed to a negative. This also occurs in the dyspnea of non-tubercular dry spastic bronchitis aggravated by physical exertion.

The Nature and Treatment of Bronchial Asthma. R. H. Babcock believes in the anaphylactic nature of the attacks, whether induced by emanations from without or by the absorption of autogenous toxins. In the latter case the difficulty is to discover the focus of the foreign protein. Most often, probably, this is in the upper respiratory tract and may be directly dealt with. But it may be within the lung, in some atelectatic or blocked lobule, and it then would be as inaccessible to any but indirect influences, as when situated in any other of the organs or secretions. Hence the rational value of autogenous vaccines. Meanwhile, however, the paroxysms have to be dealt with. Trousseau long ago recommended atropine as a preventive; and Auer and Lewis discovered that injections into guinea-pigs 0.5 to 1 mg. would mitigate or prevent anaphylactic shock from doses of protein that proved fatal in the controls. Alcohol and narcotics exert transient

and slight prophylactic effect against the symptoms of protein sensitization. Adrenalin injections, highly efficacious in most cases, may possess transient antispasmodic or antianaphylactic power. Pyridin, ethyl iodide, and the highly vaunted asthma powders very likely act in the same way, while at the same time they excite bronchial secretions. Tincture of lobelia, aspidospermin, ipecac, and grindelia, or other expectorant remedies, may be of service by promoting expectoration, and thereby lessening absorption of bacterial protein when there is extensive bronchitis. A patient was cured of his asthma for three weeks after having been etherized for a tonsillectomy, but relapsed so soon as he contracted a coryza.

THE USES AND DANGERS OF ADRENALIN IN ASTHMA. The main contra-indication specified by L. S. Fridericia¹ is the presence of any cardiovascular inadequacy. His own experience of its benefits has been considerable. They outweigh the objections based upon the occasional initial symptoms of pallor, chilliness and palpitation which have led M. Donaldson to abandon its use. In that connection, we may refer to the previously reported experience of Hertz, which proves that a much smaller dose, which is practically free from danger, is as effectual as the larger ones hitherto administered. One of the five fatalities he has compiled from literature was after an intravenous injection of 0.6 gm. in a case of pulmonary infarction from renal arteriosclerosis; the others, after uterine intramuscular injections during chloroform narcosis. In addition, two infants died from its subcutaneous injection. After its intravenous injection, Kauert witnessed a transient pulmonary edema in a pneumonic attack, and arrhythmia and dyspnea in decompensated aortic valvular defect. While numerous reports describe its evils in valvular disease and nephritis with high pressure, there is a large body of evidence recommending its value in intercurrent heart failure from acute infectious diseases. His clinic has suffered only two serious mishaps, both due to mistaking cardiac for asthmatic dyspnea. In a man of sixty-two years death occurred the second day, collapse and angina having immediately followed a subcutaneous injection (0.4 c.c. of a solution of 1 to 1000). The same dose in a woman of forty-nine with dilated and hypertrophied left ventricle caused severe dyspnea, depression and vomiting. She died three months later after symptoms of angina.

The Acute Complications of a Rapid Reabsorption of Dropsies have long been regarded as toxic phenomena. H. Vaquez shares the opinion of those who have recently viewed them as analogous to the phenomena of serum sickness and of anaphylaxis. They are, he thinks, essentially the same as those induced by Richet in his experiments on anaphylaxis and those observed by Widal in paroxysmal hemoglobinuria. They

¹ Ugeskrift for Laeger, December 9, 1915.

include fall of arterial pressure and transient albuminuria. The leukopenia of anaphylactic shock has not yet been identified with the condition by searching observations; though it has been reported in a case of partial evacuation of a pleural effusion.

Hay Fever. This claims a larger section than can be completely reviewed of the medical literature of the pollen-afflicted public. Oppenheimer and Gottlieb¹ describe "Pollinosis" as an individual sensitization to pollen protein, and its treatment, by immunization. For this there are four methods: (1) A pollen-extract injection, just before "hay-fever time," to be repeated three or four weeks later; (2) a large immune-serum injection, during the attack; (3) very small injections of pollen extract, repeated about every ten days, to raise the tolerance by minute supplies of anaphylatoxin; and (4) the injection of minimal doses of an anaphylatoxin made *in vitro*. The initial difficulty is to identify the offending pollen, whether golden-rod or ragweed; but it may be some other one out of the large variety awaiting further study.

S. Strouse and Ira Frank² publish an unprejudiced inquiry into their own (and others) results, from pollen extracts from vaccines, and from both combined. They find that 64 per cent. of patients under pollen extract, and 70 per cent. of those under vaccines, had a milder time than previously; it happened to be an unusually favorable year. The four cases under combined prophylactic pollen therapy and phylactic vaccines were cured for the season. Singly, the latter gave not inferior, or perhaps better, results. In no case was there a cure from the pollen extract.

The same number contains W. Scheppegegg's important paper on "Prevention", with a calendar of the blooming dates of ten varieties of hay-fever weeds and the following table:

TABLE 2.—COMPOSITION OF THE NASAL SECRETION.

Water	993.00
Mucosin	53.30
Sodium lactate	1.01
Organic crystalline principles	2.00
Sodium and potassium chlorid	5.60
Phosphates	3.50
Sodium phosphate and carbonate	0.90

He points out the anomaly that germination is obtained only in the presence of sugar which is absent in the secretions; and that it is inhibited by sodium chloride which is present. The line of genuine promise is that adopted by the American Hay-fever Prevention Association, of which he is president, of prophylactic education with a view

¹ New York State Journal of Medicine.

² Journal of American Medical Association, March 4, 1916.

to prophylactic legislation. He refers to its organized campaign against the weeds; and to the enlightened action of the City of New Orleans in giving effect to its recommendations.

General Treatment of the attack by calcium chloride irrespective of the pollen variety (in 26 cases) is Harold Wilson's important contribution to the same number. His prescription is: Calcium chloride crystals, 100 gm.; distilled water q. s. ad. 500 c.c.; one teaspoonful in sufficient water during or after each meal.

The anhydrous chloride is not suitable. But in this form most subjects will tolerate a daily supply of 3 grams. A pint of milk contains 0.71 gram calcium; this supply, only 0.55 gram. His main conclusion is that the complete cure rapidly obtained in some cases warrants an extended trial of the remedy. He also finds that the same daily dose may be continued indefinitely without any apparent injury.

Kellog¹ had published another medicinal cure (50 cases treated in three years): simply sodium bicarbonate in dram doses, three times daily. Marked relief was obtained in many cases, but in three he had to supplement the treatment with a bicarbonate nasal spray. The action is desensitizing. Might it also perhaps lower the solubility of the pollen toxins?

Fibrinous Bronchitis in a Case of Miliary Tuberculosis, with no Severe Dyspnea, but a Fatal Tracheal Impaction. Israel Rosenthal² reports the case of a scrofulous boy aged six years, with chronic otitis media, and a history of right bronchopneumonia (when von Pirquet's reaction was negative) had apparently recovered from dry pleurisy in January, 1915; but he remained febrile and was readmitted in March with the signs of a general bronchitis, which seemed to improve. The reaction was now positive, but no diphtheria or tubercle bacilli were found (only *Staphylococcus pyogenes albus*). On March 15, large, white, solid masses were expectorated, without effort or dyspnea, which proved to be a complete fibrinous bronchial tree, down to the smallest branches. Similar casts continued to be brought up, gradually lessening in size. Scattered bronchi and râles were audible, and at the right base some dulness and diminished respiration of rather blowing character. The prognosis was promising, in spite of two or three casts daily, as the temperature subsided. But on April 5, the respiration suddenly ceased. This was due to a complete subglottic obstruction. The right lung, under a thickened fibrinous pleura, was a mass of miliary tubercle, particularly at the base, and was practically useless. The author sees in this an explanation for the absence of dyspnea from the bronchial casts. But for us it complicates the enigma, as intense dyspnea is characteristic not only of fibrinous bronchitis but also of miliary tuberculosis.

¹ New York Medical Journal, August 21, 1915.

² Ugeskrift for Læger, September 2, 1915.

Bronchiectasis Treated by Lavage. S. Yankauer's paper¹ describes his method as follows: A double tube is introduced into the bronchiectatic cavity through the bronchoscope. Through the smaller tube, normal saline solution is injected, while at the same time suction is applied through the larger tube. The fluid is removed as fast as it enters the bronchus. By directing the tube to various parts of the wall of the cavity, a thorough irrigation is accomplished. It has been possible in this way to irrigate each lung with about eight ounces of salt water, at one sitting under local anesthesia. The patients feel the solution enter the chest and can tell when it has been removed. They do not object to the procedure. After two or three such irrigations, the foul odor of the secretion disappears, and the amount becomes very markedly reduced. Unfortunately, in a few days the irrigations must be repeated. I have done this in three cases with good results, but none of the cases have been cured. Nevertheless, the result is striking, and it seems well worth while to continue the attempt.

THE SURGICAL TREATMENT, according to J. H. Zaaijer's successful experience in four chronic cases, is a subperiosteal resection of four or five ribs for a length of 13 to 20 cm., and suturing in two tiers, with a compressing bag. The risk is small under local anesthesia, and there is little deformity. In one of his cases, a late return of trouble will necessitate the more radical step of removing the periosteum and the intercostal muscles.

A Latent Bronchial Retention of Foreign Bodies is not rare. A. Thornval² reports 16 cases (only two adults). Two patients succumbed undiagnosed (from gangrene, and from bronchopneumonia). One was long treated for phthisis (as some other reported cases). In another, ultimately x-rayed after eighteen months, and successfully tracheotomized, a brass pencil tip had set up an unexplained series of pulmonary attacks. Instances of the extraction of metallic bodies after much longer intervals are on record.

The Treatment of Diphtheria. THE INTRAVENOUS INJECTION OF ANTITOXIN will, it is thought by E. M. Dupaquier, of New Orleans, become the routine treatment. His recent experience of it in 31 cases has been favorable; fewer complications, a shorter convalescence, and fewer carriers, in addition to economy of serum, one initial dose of 10,000 units sufficing. In his series, however, one child died in three hours after a rigor and pyrexia. As regards the serum, he recommends that a more dilute solution be kept for use, clear instead of cloudy; that it should be administered warm, and after at least an hour's rest in bed, and that the gravity method be used instead of the syringe.

THE EARLY INTRAVENOUS OR INTRAMUSCULAR INJECTION OF ANTITOXIN. No time should be lost. "Clinical" diphtheria should be

¹ New York Medical Journal, February 5, 1916.

² Ugesk. f. Laeger, December 23, 1915.

treated at once in anticipation of any culture. That is the secret of Borden S. Veeder's¹ successful treatment. It is based upon Morgenroth's observation that four or five hours after an intramuscular injection there is from 5 to 20 times more antitoxins in the blood than after a subcutaneous one. For intravenous injection, preferable to the other in severe or septic cases, any available vein is selected, in fat babies the external jugular. Chill and fever are more apt to occur, but they always subside in twenty-four hours. Administered early by these routes, small doses suffice; 2000 to 5000 units will cure any diphtheria in which a lethal dose of toxin has not already been absorbed.

THE CARRYING EVIL AND THE JASMIN OIL METHOD. Long before that evil was discovered by Kayser in typhoid (1906), at a time when the recrudescence of epidemics in schools began to be traced to the readmission of convalescents, and was attributed to "relapses" in them, a systematic prophylaxis was instituted in my diphtheria ward at St. George's Hospital against the virulence and the local spread of the infection during the acute attack. The original purpose² was to minimize the infective evils inherent to tracheotomy, and the impairment which it inflicts upon the physiological mechanisms of respiration and of expectoration. Lightly creosoted oil was dropped into the trachea to stimulate those functions. From this was soon developed the wider purpose of a protecting and mechanically disinfecting treatment of the nasopharyngeal membrane in all cases, by the frequently repeated nasal instillation of oil, as a substitute for the local use of corrosive disinfectants. It was hoped that by starting this treatment from the first, and continuing it until the patients were discharged, they might be protected from an extension of the diphtherial infection to the upper respiratory recesses. This practice contained the germ of the idea of the carrying evil and of its remedy, but it found no imitators in England, and continued to be an isolated endeavor up to the date of Kayser's discovery and since. It is now apparent that if that mechanical prophylaxis had been kept up in convalescent pupils after their readmission, their infectiveness would have been greatly reduced. Of late the "mechanical" principle has been resorted to for the treatment of diphtheria carriers in the shape of local medication by kaolin, copied from its successful use in typhoid and other intestinal infections.

Meanwhile, I realized that any advantage to be gained from the oil-film method in diphtheria would be equally available in influenza, in whooping-cough, etc., and in the entire range of orinatal infections including mumps; and perhaps in some forms of catarrhal deafness. Moreover, as the slightly moist glottic surface could conduct the film, it might have a beneficial action upon the mucous membrane in laryn-

¹ Journal of Missouri State Medical Association, April, 1915.

² British Medical Journal, 1897, ii, 1564.

gitis, tracheitis, and bronchitis. This seemed to open a much wider field of usefulness, and that hope has been amply justified in the result, as stated in the same journal, 1915. In addition we are provided with a specially efficient means of relief for all forms of purely nasal and nasopharyngeal obstructions, which are always aggravated by an irritative turgor of the mucosa. Such in brief is the present range of the "Jasmin oil method," so named because that oil is exceptional among the flavored oils in being free from the addition of any irritating essential oil. That name also identifies the principle as one of mechanical cleansing rather than of chemical disinfection, and its scope as one limited to surface action. Its simple technic consists in slowly charging the upper recesses by posture; a small quantity of oil being dropped into the nostrils when the head is retracted behind a narrow bolster. Right and left inclination ensures the spread of a film over the entire mucous surface, and the subsequent gravitation of the remainder of the oil toward the larynx, when the head is raised after one or two minutes.

W. O. Ott and K. A. Roy,¹ after reviewing the disappointing results from sprays—chemical, cultural, and others, and in other cases from kaolin, or from vaccines, recommend, on the strength of 17 successful trials, the use of iodized phenol (60 per cent. phenol, 20 per cent. iodine crystals, and 20 per cent. glycerin). The swabbings need some slight care to safeguard the face and larynx. Late negative cultures were carried out in 15 of the cases. Six applications are generally sufficient. No harm results from the momentary pain, from the ephemeral thin eschar, or from the slight redness of the throat for a few days. The mode of action upon the deep-seated bacilli (localized by H. Albert to the crypts) is not clear. Kretschmer cured carriers by squeezing the tonsils. The phenol which destroys the outer epithelium, probably does not reach into the crypts; but it may permit a more thorough penetration of the iodine than when this is applied alone.

W. D. Stovall, writing in the same issue, believes in strangling the epidemics by detecting the non-immunes by Schick's test (the injection "into the thickness of the skin" of 0.2 c.c. of saline containing the proper amount of diphtheria toxin), which produces in them a slight patch of inflammation, and by subsequently inoculating them if liable to exposure, with a prophylactic dose of antitoxin.

OPERATIVE TREATMENT FOR DIPHTHERIA CARRIERS. S. A. Friedberg, after trying at the Durand Hospital with material benefit the dry powdered kaolin, as recommended by Hektoen and Rappaport in June, 1915, in the *Journal of American Medical Association*, failed in some of his cases to suppress the carrier condition. These he treated by removal of adenoids and tonsillectomy, with complete success. He believes

¹ *Journal of American Medical Association*, March 11, 1916.

that these operations are necessary for inveterate carriers, whose mucous folds and crypts keep their bacilli out of range of medicinal agents.

DIPHTHERIA CARRIERS CURED BY REMOVAL OF TONSILS AND ADENOIDS. In S. A. Friedberg's six operated cases, reported in the *Journal of American Medical Association*, for March 11, 1916 (some of them previously treated ineffectually with kaolin), the cultures became promptly negative. They were discharged after six negative tests. Removal is clearly indicated in carriers with adenoids or large tonsils. It need not be delayed beyond two or three weeks after the clinical recovery.

Parasitic Affections. **PULMONARY DISTOMIASIS**, according to K. Nakagawa, of Formosa, is traceable to three species of fresh-water crabs as hosts for the encysted larvæ. After liberation in the human jejunum they make their way through its walls and through the dipahragm into the lungs where they grow, encyst, and lay their eggs.

BRAZILIAN OIDIUM MYCOSIS. This hitherto unnoticed destructive pulmonary disease, probably widely prevalent in Brazil, has been identified by O. Magalhães in 14 cases, 6 of which were fatal, and 5 examined after death. It has presumably been mistaken in the past for tuberculosis or syphilis, rather than for any of the other mycolic affections which it does not so closely resemble clinically. Happily it is amenable to iodine in the shape of KI, or of NaI, resembling syphilis in this, more than tuberculosis, the late lesions of which are incapable of the rapid cure obtained for equally extensive damage from this affection. Other remedies are powerless against it. The lesions, as in tuberculosis, vary from small deposits in the apices or in the tracheo-bronchial glands to large cavities, not always limited to the upper lobe. He has administered NaI in daily doses of 2 to 8 gm.; and sometimes intravenously an isotonic NaI solution. The effect is compared to a resurrection; arresting the hemoptysis, and rapidly healing the lesions without any perceptible remainder except locally diminished resonance, and some roughness of breathing. A recurrence in one of the cases was due, he thinks, to premature suspension of the treatment. He calls attention to the variable faith of individual tolerance for iodides.

PRIMARY PULMONARY ASPERGILLOSIS. G. W. Holden¹ states that chronic cases simulate phthisis, the acute ones bronchopneumonia. His patient, aged forty-seven years, had had recurrent bronchitis since sixteen. Enlarged cervical and axillary glands had led to a diagnosis of Hodgkin's disease after she had been sent to Colorado for tuberculosis. She died of a dilated right heart fifty-four days after admission into the sanatorium, after symptoms analogous to chronic phthisis, but with scanty sputum, only slightly purulent. Strangely she had never had hemorrhage. Holden made the diagnosis during life from

¹ New York Medical Journal, 1915.

the sputum which gave a pure culture of the aspergillus. Most of the few cases on record were observed in France among pigeon feeders and those who handle grain and flour. The fungi pathological for man have been divided by Plaut into three groups according to their pathological effects: (1) moulds in the narrowest sense; (2) the fungus of thrush and (3) the fungi affecting the skin. Still divided the genus aspergillus into six species, and of these the most pathogenic for man was *Aspergillus fumigatus*. It was very frequently observed in the lower animals and in birds; here it often produced a pseudotuberculosis and it was supposed that the infection might be carried from birds to man. *Aspergillus fumigatus* was found most frequently in the ears, nose and mouth. When occurring in the lungs it was thought to be secondary to an already existing tuberculosis until Dieulafoy and others reported cases of primary infection about 1890.

BOECK'S SARCOID, previously classed as a cutaneous disease, is thought by Kuznitzky and Bittorf¹ to be primarily a general disease with secondary skin manifestations (which are symmetrical). In their patient, a man aged twenty-seven years, the lungs were also involved, as well as the spleen, liver, lymph glands and kidneys, with diminished white count and hemoglobin. The nodules spared the face which is their common site.

SPIROCHETAL ULCERATIVE TONSILLITIS IN SOLDIERS (from Vincent's *Spirocheta Fetida*) should, according to W. Wingrave's report in last year's *Lancet*, be cleared of slough and swabbed with 5 per cent. tricoresol in alcohol. An excellent mouth-wash for the pyorrhea is obtained by adding 5 minims of oil of lavender to this, and using a few drops in a half-tumblerful of water. Zinc permanganate ($\frac{1}{2}$ grain in 1 oz. warm water) is another efficient astringent wash where there is much swelling. Formaldehyde solution is a good antiseptic substitute for the tricoresol.

THE BLOOD, THE BLOODVESSELS, AND THE CIRCULATION

The Estimation of the Coagulation Time.¹ The accuracy of Marcus Ward Lyon's simplification of the Biffi-Brooks apparatus, described in the *Journal of American Medical Association*, March 18, 1916, approximates to that of the Boggs-Russell-Brodie method. The illustration shows the collapsible aluminum cup (to be filled, to within 1 cm. of the brim, with water at 98.6° F.), and the two platinum wires, each bearing four loops. The loops are quickly touched to the blood from a freely flowing puncture; the wires are then replaced into the notches, and covered. After two or three minutes, one of the loop drops is dipped; half a minute later the wire is again uncovered, lifted, and dipped—and so forth, till one of the drops fails to wash out.

¹ Münch. med. Wehnschr., October 5, 1915.

COAGULANTS. *Brain lipoid*, which can be easily obtained from ox brain, is a direct hemostatic for bleeding surfaces, as demonstrated last year by A. D. Hirschfelder. Its surgical trials are reported to have been successful in a variety of hemorrhages. The yellow powder is sterile; moreover, if 0.1 per cent. of tricesol be included in its preparation, it becomes in addition an antiseptic application. *Thromboplastin*, the therapeutical outcome of Hess's study of the clotting virtues of tissue extract, has been most successful at the hands of J. J. Cronin, and of others. He refers, in the *Journal of American Medical Association*, February 16, 1916, to a series of 2000 operations on adenoids or tonsils. The firm application of gauze saturated with it to the bleeding surface for a few moments practically eliminates the risks of postoperative hemorrhage and bloody vomit and stools.

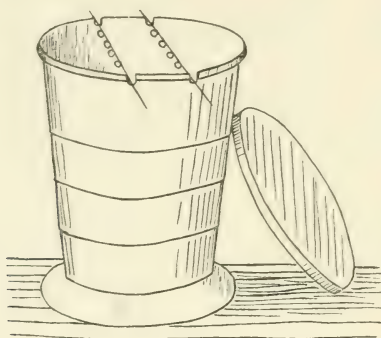


FIG. 4.—Apparatus for estimating the coagulation time of the blood.

Blood-transfusion. THE USE OF ANTICOAGULANTS IN BLOOD-TRANSFUSION, other than the leech extract or "herudin," or paraffin, which H. S. Satterlee and R. S. Hooker had previously used as an internal coating for their pipet-cannula apparatus, has been submitted by them to an experimental study. They publish in the *Journal of American Medical Association*, February 26, 1916, the result of their search for some safe, simple, and efficient agent less liable than the extract, or than the commercial "hirudin," to uncertainty of action or to possible toxic contamination. They recommend *sodium citrate*, in the proportion of 120 mg. to 300 c.c. of blood (0.04 per cent.), for use according to their own technic. That strength is $\frac{1}{5}$ to $\frac{1}{25}$ less than is employed in other methods. Another powerful anticoagulant is *Sodium metaphosphate*, NaPO_3 . It may prove to be an efficient substitute, but their experience of it has been limited to experimental transfusions in animals. In the same issue, E. Lindeman follows up his previous contributions with an instructive paper on "Reactions following Blood-Transfusion by the Syringe-cannula System."

TRANSFUSION FOR RESUSCITATION AFTER HEMORRHAGE cannot be practised where it is wanted above all, on the battlefield. Neither is it hardly practicable in newly born infants. But in them, as recently shown by Manning, a good substitute is available in serum therapy, with horse, paternal, antistreptococcus, or antidiphtheria serum. At the Lyons base hospital, Bérard and Lumière report quasi-miraculous recoveries from a moribund condition, under Carrel's transfusional technic. An advertisement brought them 150 donors in a week. Women were almost exclusively selected. The donors may themselves need reviving by restoratives or by saline and camphorated injections. Hemolysis has not occurred within their experience.

TRANSFUSION IN PERNICIOUS ANEMIA. An instructive case is related by O. Leyton in the *British Medical Journal*, April, 1916. A very lightly citrated injection of 2 oz. of blood from a neighboring erythremic patient produced immediate pallor, faintness, nausea, and severe, cramp-like pain "all over," which completely subsided in a minute. A week later the red count had risen from 600,000 to 1,050,000, and the hemoglobin from 10 to 20 per cent. Five weeks later the patient submitted to a larger injection (8 oz.). The same symptoms recurred, with much greater severity, and with vomiting for thirty minutes. The after-result was a complete disappointment, practically no blood improvement, the patient leaving the hospital after a year's treatment much the same as he had entered it. Leyton concludes that "erythremic blood is not a cure." Our reading is not so exclusive. Clearly poisonous to the anemic, might it not possibly be curative? All active remedies are both, at different doses. Why not try less than 2 ounces, and keep repeating the small dose? Leyton suggests trying the converse blood experiment, by transfusing from pernicious anemia to erythremia. Meanwhile he is investigating whether erythremia is the result of three combined conditions—hurried cell formation, delayed cell destruction, and insufficiency of plasma or of only one of them.

TRANSFUSION IN INFANCY AND CHILDHOOD has been practised safely and with immediate benefit by L. B. Robertson and Alan Brown¹ in simple secondary anemia, in marasmus, and also for hemorrhagic disease in the newborn. From their experience they believe that the risk from hemolysis and from small air bubbles is being overrated.

The Advantages Offered by the Saggital Sinus for Intravenous Injections in Infants are described by L. Tobler² as "ideal" after resorting to it in 50 cases. Marfan had used it so long ago as 1898, for saline infusion. It affords a convenient supply for any blood examinations, and injections of diphtheria antitoxin, of normal serum, and of gold preparations were made without any complications.

¹ Canadian Medical Association Journal, April, 1915.

² Mon. f. Kinderh., 1915, No. 8.

A "Bad Circulation." Cold feet are its familiar test; they are also contributory to its causation. Unna,¹ who attributes their cooling to the retention of moisture by woolen or cotton stockings, recommends a warming anklet, greasing the foot, wearing two pairs of socks in capacious boots, and providing the inner pair with an impervious coating for which he gives the formula: collodium, 12; colophony, 4; castor oil, 4; alcohol, 16; and ether, 64. Delépine has published in the *British Medical Journal*, 1915, a scientific and practical elaboration of the same idea. His ingenious trench stocking is remarkably "cold-proof." With it on the foot can be immersed for some time, without chilling, into a refrigerating iced mixture, which almost immediately paralyzes the circulation of the foot, whether bare or in the usual foot-gear. His invention has not been adopted by the War Office, but has been largely utilized unofficially in the trenches.

The Vascular Histopathology of Trench Foot is described as follows by Smith, Ritchie, and Dawson.² Arterial lumen dilated, and some fibrinous deposit; endothelium swollen; muscular fibers vacuolated in the media; perivascular cell proliferation. Sometimes, especially in inveterate edema, there is a diffuse tissue infiltration with leukocytes. Lastly, some edema of the axis-cylinders without any degeneration of the myelin; and no abnormality of the spinal nerve cells.

Raynaud's "Syndrome," or Raynaud's "Disease." O. T. Osborne's³ analysis of 11 cases has led him to the following conclusions: (1) Raynaud's disease is only a syndrome, caused by the disturbance of one or more internal secreting glands. (2) There is primarily no real disease of the bloodvessels, but the vasomotor control is upset. Profound contraction of certain bloodvessels may occur in different parts of the body, coincident perhaps with abnormal dilatation elsewhere. If the contracted vessels are peripheral, the parts lose some of their function and trophic supply. (3) The spasm may, however, occur in the internal organs. This is less frequent and more difficult to diagnose. (4) The syndrome is probably due to disturbances of more than one of the ductless glands. But there is always apparently some disturbance of the thyroid gland; perhaps a diminution of its vasodilator substance. (5) Judiciously applied, thyroid treatment improves the majority of cases, perhaps all, and it cures some of them. Nitroglycerin is always of temporary, and local heat always of immediate, benefit.

Raynaud's Symmetrical Gangrene. A. L. Hoyne, who relates a fatal case, with necropsy, in a boy aged five years, in last year's *Journal of American Medical Association*, follows C. E. Riggs in suggesting the desirability of restricting the title "Raynaud's Disease" to the gan-

¹ Berl. klin. Wchnschr., May 31, 1915.

² Lancet, September 11, 1915.

³ American Journal of the Medical Sciences, August, 1915.

grenous group (less prevalent in America than it is in England and France or Russia and Germany), to the exclusion of those of recurring *local syncope* or digital anemia, and of *local asphyria* or digital cyanosis (not invariably preceded by local syncope). The etiology of the gangrene is obscure, and likewise its pathology which Hoyne reviews as follows: Raynaud attributed it to arteriolar spasm from some central nervous derangement in their innervation. Weiss, however, thinks it is not so much the arteries which are contracted as the corresponding veins; and that the gangrene is trophic, not vasospastic. Pitres and Vallard found structural nerve changes in cases of symmetrical gangrene. Lustgarten appears to believe that a syphilitic origin is always to be suspected. But, according to Raynaud, no pathological changes should be found in the intima. And yet, in spite of this, the opinion has been advanced that the condition is due to a proliferation of the endothelial cells. Morgan could not identify any proliferation. It has been suggested by Koga, of Japan, that an increased viscosity of the blood is responsible for the symmetrical gangrene; but that view is hardly tenable. The theory has also been advanced that the disease is due to some sudden bacterial invasion. That the central nervous system is partially at fault there can be no doubt. Hoyne suggests that in his case the acute infectious attacks had produced a toxemia which impaired the central nervous system, either primarily or through secondary nutritional changes in the blood. Anemia seems to be a common feature. In short, the nervous system lacks the proper nourishment necessary to maintain its equilibrium, and its control over the vasomotor system. The diagnosis has to be made from a variety of conditions, by exclusion. As to prognosis: Acute fatal cases are extremely rare. Even severe cases, with mutilation, usually recover. Hoyne's conclusion as to treatment is that practically everything has been tried in vain, including nerve stretching, Roentgen rays, galvanism, Bier's hyperemia, atropin, nitroglycerin, thyroid extract, salvarsan, injection of normal salt and of Ringer's solution. All have had their advocates. Peyton also concludes that drugs are of no value. Symptomatic treatment is all that can be advised. The parts should be kept warm and dry. When gangrene develops, the case must be considered from a surgical point of view.

A SYMMETRICAL GANGRENE in both feet and legs was associated with severe epileptic attacks of grand mal in an Italian, aged twenty-three years, whose case is reported in the *Journal of American Medical Association*, February 26, 1916, by D. F. Weeks and D. S. Renner. It proved fatal from secondary toxemia in twenty-three days.

Sudden Pulmonary Embolism, and Successful Postmortem Cesarean Section. Alonzo E. Mack's¹ brilliant record is probably unique in the

¹ *Journal of American Medical Association*, August 28, 1915.

apparent hopelessness, and in the ultimate complete success of his resourceful efforts at fetal resuscitation. The mother had died probably three minutes before he arrived, and the operation was immediately performed. The child was apparently dead. For forty minutes there was not a gasp, or audible beat, or other sign of life, in spite of artificial respiration, Schultze's method, and alternating immersions in hot and cold water. Epinephrin solution 1 to 1000 was at hand; the stump of the cord was three-fourths inch long. The thought occurred that this might be used for an intravascular instead of an hypodermic injection; and it was at once carried out, after pushing the needle point well through the abdominal wall. Within two minutes the cord pulsated, and the heart was soon felt and heard beating. That resuscitated dead child from a dead mother never ailed for a day, and when seven months old weighed nineteen pounds.

Arterial Embolism. GANGRENE PREVENTED BY REMOVAL OF RADIAL AND ULNAR EMBOLI. The trouble was angiosclerotic, not apparently cardiac, in a man aged fifty-two years, in whom J. Nicolaysen reports, from Christiania, his success in unblocking both arteries at separate operations. Thirteen hours had been accepted as the time limit for the possibility of recuperation after complete obstruction, but in this instance the successful operations were delayed for twelve days and nineteen days respectively.

Blood Manometry, Its Correct Theory and Practice, are ably set forth by J. J. Rowan, Jr., in the *Journal of American Medical Association*, March 16, 1916. In every case he has found that the bare arm gives from 10 to 30 fewer mm. of pressure than the clothed. Again, 100 careful testings of the auscultatory *versus* the palpatory readings have shown him that the former are invariably from 5 to 10 mm. higher than the latter. He aptly compares the "systolic" pressure to a final summation of "all the pressure factors," analogous to that which conditions the jet from any garden hose worked by pumping—(then why "systolic" we might venture to ask; why not simply "maximal," to avoid a confusing misnomer, as we mean in reality that the so-called "systolic pressure," is something different from the pressure wrought by the systole?). As a fact, every moment of the pulse-time has a different pressure. The figures record only the acme of the pulsatile pressure wave from the left ventricle; and the initial level from which the diastolic pressure steadily subsides. Again, as the *mean pressure* we read off has no genuine existence anywhere at any moment in the pulse itself, its only reality being that it is included in our calculation of *all* the pressure factors, extra-arterial as well as intra-arterial, why list it among the living pressure events? The "pressure pulse" (a term neither explicit or descriptive) is the left ventricular pulse. Within the ventricle its pressure grows from nothing (being previously suctional) to a maximum, until, lifting the aortic flaps, it is suddenly

added to the minimum diastolic remainder of the surviving intra-aortic pressure; immediately raising this to its systolic maximum. That intermittent ventricular pressure stroke, great or small, drives the entire circulation, and is the source of all its pressures, both diastolic and systolic. The circulation stops when its pressure from that stroke is weaker than the diastolic remainder of pressure beyond the valves. The valves are then not lifted; there is no aortic refill, and no driving pressure thrown into the arteries. In a rigid system, with only rigid resistances, the entire pressure value would travel at once to the periphery. But our yielding elastic aorta delays much of the blood charge, which absorbs a corresponding amount of its pressure. The maximal sphygmometric reading at the periphery is diminished by so much. With the aortic recoil that delayed instalment of blood and of pressure is gradually added the peripheral driving pressure. At the periphery, the driving pressure steadily overcoming the arteriolar and capillary resistances is at the finish mainly a recoil pressure—chiefly from the aorta in health, but chiefly from the overstretched arteries if the aorta should be inelastic. These varying factors underlie a correct interpretation of the purely momentary systolic maximal reading, and of the equally momentary diastolic maximal reading. The latter is timed by the closure of the aortic valves which is easily identified at the heart, not so easily at the periphery.

The “diastolic pressure” would not exist if the aggregate lumen of the arterioles were open. It would be very high if this were completely closed. But the arteriolar aperture varies; and thus the degree of the diastolic pressure is a measure of a varying resistance. This varying factor is second only in importance to the other main pressure factor, the driving power of the ventricle. In reality, the initial or maximal diastolic pressure, the only diastolic phase which we can seize upon to measure, determines the amount of force which will be required from the ensuing ventricular contraction. Sphygmometry has, therefore, awarded to it the highest significance. The only other point we might add to the accepted exposition of the diastolic question is that the significance of the maximum or initial pressure is by no means uniform. It may be very high, though only for a moment, because then raised not exclusively by arteriolar resistance but in part by a very powerful systolism from some other stimulation of the medulla, psychical, reflex, or physical (*e. g.*, electric); its driving pressure being still considerable when the valves close. The evidence is in the “subsequent” behavior of the diastolic pulse, which the manometer cannot report, which the sphygmograph under its set pressure can report only imperfectly, and which only the adaptive pressure of the finger is able to roughly gauge. Tactile “diastolic” pulse exploration is therefore essential, though this is generally ignored, as in this excellent paper.

The technic is lucidly described by Rowan. When everything is

ready the stethoscope is kept slightly pressed over the brachial bifurcation, and inflation is started. At the first faint thump, the mercurial reading is noted; the level immediately beneath it is that of the diastolic pressure. Under further rapid inflation, the sounds grow, then decrease, and they cease when the vessel is closed. After a few additional squeezes, the air is allowed to escape very slowly. The descending mercurial level (minus 1 mm.), where the first thump is again heard, is that of the "systolic" pressure. More air is let out quickly till the thumping weakens, and then more slowly. The level of the last thump (plus 1 mm.), is again that of the diastolic pressure. In this way, both pressures are obtained going up the scale, and then verified coming down it. The pressure pulse is the difference between the systolic and the diastolic reading. Both arms are tested, and the higher reading is adopted. Each compression should not exceed one and a half or two minutes. He insists upon the significance of a high- or a low-pressure pulse: if it is low, all is not well. Its rising day by day signifies a progressive recuperation. Therefore, pressure observations are of little value unless compared day by day. Isolated determinations are not reliable evidence of the average blood-pressure of the subject, and the effects of any treatment can only be ascertained by accurate comparison. For this, the auscultatory method alone is trustworthy.

The Systolic Blood-pressure in Pregnancy. Irving draws some important conclusions from his observations in 5000 consecutive cases: (1) In 80 per cent. of pregnant women, the blood-pressure ranges from 100 to 130. (2) In 9 per cent., the blood-pressure may be below 100; still a blood-pressure below 90 does not ensure against hemorrhage at parturition. (3) In 11 per cent. it may be above 130. High pressure is more frequently a sign of toxemia below the age of thirty. (4) It is both a more common and an earlier sign than albuminuria. (5) In the absence of the latter it may yield to catharsis, or resist treatment, without harm occurring. (6) An unexplained progressive rise is ominous. (7) Toxemia is much more common with pressures above than below 150. (8) Eclampsia sometimes occurs with moderate pressure; most commonly with 160 or more. (9) All toxemics developed albuminuria and high pressures also. (10) His percentage of fatalities is about the usual; but it might have been much less, as two-thirds of those who developed convulsions had absolutely neglected advice and refused to attend the clinic. Had they been struck off the list for disobedience, very favorable statistics would have resulted.

The Auscultation of Arteries for an Estimation of the Peripheral Resistances. L. Bard¹ has been able to detect by this method slight degrees of pulsus alternans. He devotes to that subject one of his two papers.

¹ Archives des mal. du cœur, May, 1915.

The other describes his auscultatory method and its results. The pressure of a stethoscope produces a murmur, and variously modifies any preëxisting murmurs. More reliable results are obtained from the graduated pressure of a cuff, and from listening through a phonendoscope. This renders the heart sounds audible. Local murmurs are also always produced, which are faint in normal subjects. If the circulation is not normal, these murmurs may be intense (as in simple aortic insufficiency, though not in that of syphilitic aortic origin), or imperceptible (as in hypertension of renal origin). His contention is that the artificial murmur is dependent upon the emptying of the artery below the constriction; for it disappears if this be kept full by a second distal cuff stopping the blood from escaping through the capillaries. If this should not have been applied, the artery would empty itself normally, but it will be kept full if any abnormal resistance in the capillary district should impede its outflow. On those assumptions he frames a clinical method of daily examination for an artificial murmur, as a guide for the treatment of any affection of the circulation, according as it may have revealed itself to be either primary or secondary.

Hypertensive Blood-pressure, and Familial Cardiovascular Disease have become more frequently traceable, by means of the searching luetin test, to a common origin from inherited syphilis. H. F. Stoll's¹ investigation of 109 cases yielded 90 per cent. of positive reactions. This suggests to him (1) that hypertensive disease may be the most frequently inherited of the "late" manifestations, and (2) that apoplexy and sudden cardiac failure in middle age are probably most often due to syphilis. In the first group, when the systolic pressure is below 200, mercurial treatment carefully continued for several months has given satisfactory results, and it is well borne by the kidneys. In the second he suggests that, as some degree of familial infection may be assumed as probable, a systematic prophylactic treatment of the surviving parent and of the offspring ought to be regarded as essential. We may add that Lenz has estimated that 25 per cent. of all syphilitics develop aortitis.

The Significance of Pulsus Alternans for Prognosis is ominous; but not as uniformly unfavorable as had been assumed. Many instances have recently been recorded of its persistence for years, either continuously, or for recurring periods. The question has its "individual" complexities in two definite directions: (1) The physiological susceptibility of the individual heart, as well as any pathological deterioration; and (2) the nature and extent of the pathological state of the organism under which the weakening heart has to struggle—this may be most often the decisive factor. C. O. Hawthorne's lucid analysis in the *Lancet*,

¹ American Journal of the Medical Sciences, August, 1915.

1915, is mainly along the first line. By combining the manometric with the polygraphic method it is possible to bring out larval degrees of an alternating difference in the strength of the systolic contractions (as well as differences which are not rhythmic). The typical or declared pulsus alternans is thus the aggravated expression of a relative cardiac fatigue which may have had many latent degrees, each of them variously attributable to actual loss of myocardial strength or to some increase in the myocardial irritability. In short, pulsus alternans, which is essentially an enforced alternating rest for the heart, may have in effect a protective significance in addition to its plain meaning that the myocardium is no longer equal to its burden. Too often the cardiac failure is progressive, while the burden is also continuing to grow. That is why the symptom is of bad omen in the majority of cases.

SYSTEMATIC OBSERVATIONS ON PULSUS ALTERNANS, extending over a period of eight months, are recorded by P. D. White in the *American Journal of Medical Sciences*, July, 1915. It occurred in 71 of 300 cardiac and cardiorenal cases. In 201 more or less decompensated hearts, 65 showed fibrillation; 66 others gave pulsus alternans (15 of continuous, 55 of premature systolic, and 1 of merely phasic, type). Premature systolism preceded the onset of the continuous type in 77 per cent. The usual life period is after fifty; and arteriosclerosis is a more common causal factor than rheumatism or syphilis. As in heart-block and fibrillation, the male sex predominates. Of the 71 patients, 25 succumbed within ten months to cardiac aggravation. In 4 others, the alternation diminished or disappeared under rest and digitalis. In a much smaller series, A. E. Carver has recently emphasized the essential distinction between a cardiopathic causation and a merely toxic influence after some severe infection. The latter type affects both sexes more evenly; and its prognosis is relatively favorable.

Venous Pressure in Cardiac Disease. Among the results published by A. H. Clark¹ from his 276 observations by means of Hooker's method modified, the following should be mentioned. Two-hourly records, taken during twenty-four hours in bed, confirmed Hooker in his conclusion that the pressure has its maximum during sleep in heart disease, and during the day in the healthy. Before death it remains continuously high, above the 20 cm. level. That continuous high level, when not amenable to the digitalis group, identifies a grave cardiac state. On the other hand, when continuously below 20 cm., the pressure does not provide any reliable data as to the action of digitalis or strophanthin. Venous pressure and urine output are usually in inverse proportion. After venesection, the pressure rapidly rises again. Pleural tappings lowered it in 7 out of the 8 cases operated.

¹ Archives of Internal Medicine, October, 1915.

The Treatment of High Blood-pressure is discussed by H. Strauss in last year's *Therapeutische Monatshefte* from the clinical standpoint. Hyperpiesis, pure and simple, is that which is not complicated by any subjective symptom. In renal sclerosis it is apparently a compensation, aiding, together with cardiac hypertrophy, the maintenance of an average excretion. Its clinical indication is to protect the kidney from aggravations, and the heart and vessels from avoidable strain. Practically, this means an avoidance of meat excess, of coffee and alcohol, of constipation and its risks from straining; and an easy life in a protecting climate, with daily rest at noon. The complication of subjective symptoms indicates arteriosclerosis, both as a product of high pressure, and as a cause for more of it, as is well shown in gout and other metabolic disorders. Rest in bed may of itself suffice to subdue the symptoms for awhile. For a permanence, medication is necessary. It can be effectual even though the heart may be beginning to fail. Spa treatment is the best, because furnishing varied curative measures in addition to climatic protection. Independently of it, he has succeeded in warding off danger for years by minimal doses of digitalis (0.1 gm. as a daily dose). Better than any is its intermittent use, alternating for two weeks with two weeks of iodine. Simple hyperpiesis, free from symptoms, has a relatively favorable prognosis.

A Vasotonic Mechanism, Independent of the Vasoreflex Mechanism, has been demonstrated by W. T. Porter and A. H. Turner by applying curara to the vasomotor centre—hitherto credited with their joint control. The tonus was unchanged, but the sciatic and the depressor vasomotor reflexes were doubled. Alcohol too, at certain doses, spares the tonus, but completely suspends the vasomotor reflexes. *The cardio-inhibitory* centre, according to experiments by F. R. Miller and T. R. Bowman, published in the *American Journal of Physiology*, December, 1915, is situated where recent histology had placed it, in the dorsal vagus nucleus.

The Functional Disorders of Arteries, though more common and hardly less distressing than those of the heart, have been little studied. Sir Lauder Brunton instances, in last year's *Lancet*, the familiar abdominal pulsation, probably due to some nervous irritation reflexly inhibiting the vasoconstrictors in the abdominal aorta, as a type applicable to other large arteries, with some underlying factor of systemic intoxication. Functional constriction is answerable for migraine, Raynaud's disease, angina pectoris, epileptiform and apoplectiform attacks, and some visual disturbances. In migraine, and probably in most of the others, a toxic irritation is the cause of the spasm, but some local condition determines its locality, whether for the state of spasm or of relaxation, the toxemia should be treated by evacuant measures and diet. Iron is indicated in anemia; phenacetin or antipyrin, or full doses of salicylate, for migraine; nitrites in severe arterial spasm, also

benefited by salicylates, bromides, and potassium iodide. In arterial dilatation, bromides, jaborandi, and, at the menopause, ovarian extract are often productive of alleviation.

Confirmed Arteriosclerotic, i. e., Cardiovasorenal, Subjects are described by Bishop in the *Medical Record*, 1915, as "sensitive" (with individual differences) to the animal proteins from meat, fish, and eggs, less often from fowl. Safety lies in avoiding all these for the richly varied alternative of cereals, vegetables, fruit, fats and oils, and every kind of milk food. The food factor is paramount. It determines cellular health or decay. Alcohol is a side agent only. Tobacco, for some an arch cardiovascular poison, ranks in them second as a determining factor. *Chronic food poisoning* is worked from the bowel. With equal obviousness, it can only be worked off by exercise in the best air, our automatic moderator of hyperpiesis. These regulatory measures are best submitted to at Saratoga or at European spas. Arteriosclerosis has its worst enemy in the "specific course of treatment" by electricity, radium, depurative salines, or fashionable iodine compounds. Opinions may differ. Our own is that Bishop's three indications are the essential ones, and of all the most radical, curative, and simple, namely, castor oil, abstinence from animal proteins, and exercise—our three best single remedies, from medication, from diet and from hygiene. For heart distress, high pressure, and albuminuria, the *initium medendi* is *Oleum ricini* ʒj, to be repeated the third day; then in one, in two, in three weeks; and thenceforth once a month. Valuable adjuvants there are (potassium iodide, digitalis, nitroglycerin, hydrotherapy, and physical methods), but they should not supersede the indispensables.

Sclerosis of the Pulmonary Artery; its Radioscopic Diagnosis. Emil Savini gives the following description in last year's *New York Medical Journal*. The first striking feature of the picture is the great dilatation of the heart, and its displacement to the right. The upper part of the arch formed by the left pulmonary artery is bent strongly to the left, is very convex, and pulsates alternately with the left ventricle; the lower part, which corresponds to the left auricle, is affected in the same way but not to such a degree. The movements of all the sections of the heart and of the great vessels are very brisk, and of greater amplitude than usual. The fields of both lungs are rather dark because of the congestion; the parts that appear brighter, especially below, are emphysematous, while very dark apices identify tubercle. The diaphragm moves well on both sides. The so-called hilus shades are darker on both sides, and much more marked than normal. Chalky glands may be seen here and there. All pulsating hilus shades come from branches of the pulmonary artery.

Lower Colon Arteriosclerosis, in a chronic abdominal sufferer, led to two severe attacks of colic, and, within five days, to ileus which proved fatal in spite of laparotomy. There was no intestinal obstruction,

but some of the arteries were obliterated and several calcified. J. A. Hedlund reports the case in *Hygiea* as one of the unusual instances of almost exclusively abdominal arteriosclerosis which usually leads to the diagnosis of angina pectoris. Conversely, in de Blasi's case of pseudogastralgic angina, noted in the *Journal of American Medical Association*, July 17, angina had not been suspected, although aortic dilatation and pulsations had been noticed in the attacks.

Phantom Aneurysms (other than those of the abdominal aorta, which are of a clearly nervous and transient character) are described by S. West in the *Lancet*, September 4, 1915, namely, in the subclavian (1 case), and in the axillary (8 cases). Only one of the subjects was a female. He is not aware of any previously recorded instances. He has also found a similar condition in the innominate, in the carotids, and once in the arch of the aorta. None of these dilatations become permanent.

The Significance of the Pericardium. Barnard's classical description of the pericardium as an inextensible supporting membrane for a dilating heart, capable of resisting an intense pressure of more than one atmosphere, is of course only applicable to it under exclusively physiological conditions. Pericarditis and the sustained pressure of pericardial effusions relax its fibers and stretch it to much greater capacities. Y. Kuno, in the *Journal of Physiology*, 1915, p. 2, confirms his observations. By removing the pericardial membrane in animals, he has established the fact that it is indispensable for the mechanism of a normal heart's action. The first result is a functional irregularity. Venous overdilatation soon follows, and a series of pathological changes are induced by valvular incompetence, chiefly of the curtain valves. Myocardial ruptures occur first in the outer layers; but ultimately involve mainly the inner left ventricular wall, the septum, and the entire surface of the heart.

MARFAN'S EPIGASTRIC ASPIRATION OF THE PERICARDIUM is described in the *Medical Press and Circular*, 1916, by Prof. Chauffard, of Paris. He believes that it will supersede all other methods. The trocar is introduced just below the apex of the xiphoid, and is pushed up almost in contact with its posterior, and with the posterior sternal surface after a preliminary hypodermic of spartein or of camphorated oil.

The Mediastinum. A CASE OF CONGENITAL ATRESIA OF THE ESOPHAGUS, gastrostomized on the fourth day and fatal on the seventh, is reported by E. O. Jones and J. B. Manning.¹ It belonged to the common "inosculating" type; the upper portion ending in a dilated pouch, and the lower end passing from the stomach into the trachea. The frequency of this type suggests a uniform embryonic origin. Associated defects, such as hare-lip and cleft palate, are not uncommon.

¹ *Journal of American Medical Association*, March 11, 1916.

In view of the pulmonary difficulty after gastrostomy, a jejunostomy would seem better suited. The outlook, at best, is hopeless, since a plastic operation on the middle of the esophagus would hardly be possible.

Cardiac Pathology. THE MECHANISM OF THE BACTERIAL INFECTION OF THE HEART VALVES might be a mere deposition from the blood into any accidental rift in their lining, as in Ribbert's experimental production of valvular endocarditis by injecting into the circulation a suspension of potato particles charged with staphylococci. An editorial reply to an inquirer in the *Journal of American Medical Association*, March 4, 1916, refers to this, and also to Köster's previous embolic theory (1878) to which Rosenow has contributed considerable support by his recent experimental work (1912). He found that "in rabbits, endocarditis, after intravenous injection of certain strains of pneumococci, developed on the basis of small hemorrhages into the valves; caused, presumably, by the lodgement of cocci in the capillaries of the valves, the avascular structure of which serves to protect the cocci until they grow into clumps, around which fibrin is precipitated." It is also suggested that chronic and sclerotic processes in the valves, leading to functional disturbances, may result from hemorrhages into the valves in young persons from the lodgement therein of bacterial emboli, as well as from actual endocarditis by extension.

THE STREPTOCOCCUS VIRIDANS HAS BEEN RECOVERED FROM THE DUST OF A BALCONY IN A NEW YORK STREET, by Wm. C. Thro,¹ some of the strains cultivated proving pathogenic for rats. He states that it is rarely ever absent in any buccal or respiratory infections, or from the tips of the dental roots extracted in chronic infectious arthritis, some strains behaving like a *Micrococcus rheumaticus* grown by Beattie. He still attributes the common transmission of the infection to contact, to sneezing, or to expectoration, but he recognizes the possibility of its spread by dust. J. H. Richards has isolated *Streptococcus viridans* from the blood in several cases of chorea. Thro's paper contains many other instructive references.

A MECHANISM OF PROTECTION AGAINST BACTERIAL INFECTION. Agglutination, the characteristic property of immune serums, was discovered soon after the discovery of specific bacteriolysins. C. G. Bull² attributes to it a leading share in the mechanism of immunization. After any accidental microbial penetration through the bacteria-proof cutaneous or mucous investments, the second line of natural defence against the invasion consists: (1) In the bacteriolytic or bactericidal properties of the body fluids. (2) In the phagocytic property of leukocytes and other cells. The *Bacillus typhosus* and some others

¹ Journal of American Medical Association, March 4, 1916.

² Proceedings of National Academy of Sciences, 1915, p. 545.

have been seen undergoing lysis in shed blood or its serum constituents. But many, such as the pneumococci and streptococci, are not dissolved away. (3) Artificial protection may be secured by means of immune serums. These, however, do not appear to destroy the bacteria by lysis (*i. e.*, solution). According to Bull, bacteria circulating in the blood are quickly removed when they have been agglutinated into clumps, and the clumps are then deposited within the organs to be taken up by phagocytes and digested by them. Everything depends upon the size of those clumps. The agglutination follows immediately upon the introduction of the serum, and the blood may be cleared of bacteria within a few minutes into the spleen, the liver and the bone-marrow. If small, the clumps are soon ingested by the tissue phagocytes; not so if large, as after any large doses. They would then multiply again, and a second invasion would take place. Small doses are thus better than large. Moreover, Bull believes that the pathogenic property of bacteria probably depends upon their agglutinability by the blood, whether in normal or in immunized individuals. For instance, after injection into the circulatory blood in rabbits the influenza organism will be clumped and removed if of the non-pathogenic variety; they will remain in the blood without any clumping.

Cardiac Syphilis; Its Incidence and Diagnosis. The discussion on J. M. Anders's paper reported in last year's *New York Medical Journal*, reflects the latest tendency of clinical thought to attribute to syphilis a much larger responsibility for cardiopathies than hitherto suspected. Anders has collected 219 cases from the statistics of Longcope, Allbutt, Fiessinger, Collins, and Babcock, including myocarditis, mesoarteritis, angina pectoris, and aortic incompetency. In 133, or 60 per cent., the etiology was clearly syphilitic—and this was not an overestimate, as Wassermann's test had not been applied to all. We can only hope that this may not be merely a wave in our pathological fluctuations. We had thought that we could always diagnose syphilis at the beginning, even when congenital. We are now realizing that it may for years underlie the appearances of health. Like other microbial infections, it has its "carriers," although that term has not yet been stamped into use. But we have yet to find whether, as in diphtheria, typhoid, and others, the carrier can ever remain syphilis-intact. Happily, therapy has developed in advance of diagnosis. When both are quite abreast, we might look for great saving of life and health. Anders states that when myocardial syphilis developed in the secondary stage the onset was rapid or even acute, and the principal features were irregularity of heart action, tachycardia, intermittence, extrasystole and rarely soft murmurs, especially in the mitral area, or anginoid pains. These symptoms might disappear after a few days as the result of energetic antisyphilitic treatment. The Stokes-Adams syndrome was not infrequently caused by syphilitic myocarditis or

fibroid change in the bundle of His. Of 270 cases of angina pectoris collected from the literature, only 26 per cent. gave evidence of syphilis. This was too low an estimate since no mention was made of the Wassermann test having been made. Every case of angina pectoris during the younger period of life was open to the suspicion of syphilitic origin. The early treatment consisted of the alternate use of salicylate of mercury and salvarsan. The iodides were reserved for later use after the active syphilitic process had been checked. In his opinion, salvarsan was feasible in the later stages of myocarditis, and aortic insufficiency when short of advanced degeneration.

SYPHILIS AND THE MARRIAGE CERTIFICATE. The upshot of Bruhn's¹ critical study of our therapeutic management is that more years of supervision are needed than hitherto supposed for the strict control of the infection and of the infectivity of individuals, and therefore for their certification. The inveterateness and the prolonged latency of the infection after initial treatment are a recent revelation due to the increasing use of the specific tests. Disquieting facts have been compiled, which are at the least ominously suggestive of a latent lingering infectivity. A much higher percentage of late infections is stated to have been found in the families of sufferers from tabes or paresis (from 60 to 75 per cent. of all cases in that group) than in those of other syphilitics. For instance Raven has published notes of ninety families in which a case of "metalues" had developed.

THE DIAGNOSIS OF LATENT SYPHILIS after treatment for tertiary symptoms has been shown, in the *American Journal of the Medical Sciences*, 1914, by Vedder and Borden's comparative tests in 744 discharged soldiers to be much more reliable with Noguchi's cutaneous reactions to luetin (the extract from pure culture of *Sp. pallida*) than with Wassermann's reaction. 32 per cent. of that group yielded positive luetin results, against only 20 per cent. positive Wassermanns.

The Soldier's Heart. This subject has been approached in the *British Medical Journal* last year by Sir James Mackenzie, and this year by Sir James Barr, in addition to numerous other contributors in all the medical journals. The trouble had first been focussed in the United States by Henry Harthorne, in 1864; and also the same year in London, by a War Office Committee, which sat for five years, and introduced the brace. This, however, did not prove a cure. Arthur Davy, in 1876, attributed the evil to the "setting up" drill, as calculated to dilate the heart. But here again, the theory failed to get a confirmation from the results. In the interval, Dr. Arthur Myers, of the Coldstream Guards, had contributed, in 1870, an important paper describing the affection, and tracing it to accouterment, and Da Costa, in 1871, his well-known study of 300 hospital cases, which coincides in the main with

¹ Berl. klin. Wchnschr., 1915.

Mackenzie's views. He had noted, however, that intercurrent febrile attacks quieted the heart instead of exciting it.

Mackenzie and Wilson's conclusions are based upon 400 cases. At least 90 per cent. of those previously certified and treated for heart disease proved under their examination not to be primarily heart cases or to require the treatment appropriate to heart failure. The signs and symptoms of these "irritable" hearts which are easily quickened by exertion for short or sometimes for prolonged periods, are almost the same as often witnessed after exhausting infective attacks, such as typhoid or influenza; after the ordeals of some severe operation, or after long mental and physical strain with curtailed sleep, as in non-professional nursing. His experience in civilian practice has led Mackenzie to attribute a predominant share to the toxic factor as disabling normal hearts for the severe exertions of the training camp or of actual warfare. He points out the essential difference between "relatively" poisoned hearts under the influence of toxins, and those "acutely" infected by microbic invasion; the outlying group being that of the chronic heart affections. That group is more apt to come under the observation of the examining boards for recruits. He believes it has been overestimated numerically, owing to a misinterpretation of the purely functional significance of temporary irregularity of action, and of occasional murmurs not due to organic valvular defect. This applies also to examinations for invaliding. It explains the unwarranted frequency of the diagnosis of heart disease attached to the invalids sent home, and also the mistaken treatment instituted under that certificate. The "soldier's heart," pure and simple, should first be correctly diagnosed by the test of cardiac efficiency rather than merely by physical signs. Having been diagnosed, it should be treated by reconstructive hygiene of rest, of diet, and of psychical encouragement, but not by prolonged confinement to bed, most likely to undermine the morale of the patient and the strength of the heart. On the contrary, as soon as any toxic influence has been wiped out, a systematic physical and psychical reëducation should be undertaken by graduated activities, selected from those most congenial to the individuals. On that scheme, he has restored many of them to efficiency.

The Signs and Symptoms of cardiac disablement by toxins are well known to practitioners. They sum up in "a general sense of exhaustion" with cardiac, and consequently mental, depression and irritability; the central nervous system being affected in a manner not observed in primary heart failure. Besides dyspnea and heart hurry on exertion there is a consciousness of discomfort, and sometimes pain, at the heart, which is apt to be intensified by any attention called to it. Pain occurring "at rest" is suggestive of a toxic derivation; anginal pain does not occur in the young except from "physical effort." Heart irregularity, murmurs, and dilatation are often traceable in them to a

general and to a cardiac toxic depression. The nosological definition of the "soldier's heart" under that prevailing toxic derivation is not heart disease, valvular disease, or dilatation, although the requirement of "precision" usually forces the certifying pen. In reality, it cannot be given in cardiac terms, because it is only the product; it can only be expressed truly in terms of general exhaustion. *The onset* of the absolute disablement is sudden, and variously determined by any sudden stresses. But most sufferers describe a preliminary stage of indisposition which suggests an ingravescent toxic incubation in the system at large. The individual variety of the toxin is a subject for bacteriological investigation, which is beyond the possibilities of primary examinations at the front. Such, in general outline, is Mackenzie's pathology and clinical management of the condition.

R. McN. Wilson, while agreeing in the same general conclusions, makes special reference to the most recent view, that of a causal influence from faulty thyroid action by excess or defect. This he does not profess to discuss thoroughly. But 18 of his own cases had definite enlargement of the thyroid gland, and thyroid extract seemed to increase the symptoms. X-rays to the thyroid have been credited with a beneficial action in some cases, but he has seen instances with the same clinical outline which have not benefited from them. He recommends an open mind as to etiology. Many tempting views arise, but only a few stand the test. The same issue contains two other interesting papers: "On Certain Vascular Phenomena of Cardiac Diseases," by B. Parsons-Smith, and "On the Heart's Action in Jaundice," by J. Davenport Windle.

Sir J. Mackenzie's Memorandum for the benefit of recruiting medical examiners has been approved by the War Office. Some murmurs and some irregularities of rate or rhythm are not indicative of disease or impairment. The best guides are the individual's recent record of functional capacity as evidenced by the kind and by the degree of his avocational efficiency, and the actual testing of his tolerance for severe physical exertion. Although a systolic murmur may be heard at the apex, midsternum, or base, it may be termed "physiological in effect" if exertion does not impair the fine balance of the intracardial circulation, and embarrass the heart's action by progressive overcharge and distention on the right side or on the left, or in the pulmonary circuit. As regards rhythm, the ominous irregularities from fibrillation or block are self-excluded; they do not permit attendance for examination. Among the minor sorts, the most common in the young is a variability in the pauses under respiratory influence. Inspiration hurries the beats, expiration slows them. That peculiarity, when suspected, can be made manifest by a series of slow and deep breaths. It is not of serious import, and should not disqualify the candidate. The least important form of occasional intermittence is the occasional extra-

systole. Two rapid, short, sharp sounds are heard during the long pause. If there should be no other sign, such as functional inadequacy or abnormal size, the candidate should be passed. Lastly, healthy hearts may be excited by the examination into forcible action, or palpitation, and a murmur may be set up. These subjects should be made to lie down and to breathe deep and slow for a few minutes. If the heart quiets down quickly under the steadying influence of deep expiration, any candidate may be passed whose previous record is one of functional efficiency.

THE SOLDIER'S HEART AND ITS RELATION TO THYROIDISM. Sir James Barr has furnished the *British Medical Journal* with a summing up of the soldier's heart controversy just in time for our report. At pains to "imbibe from its varied statements as little as necessary," he had to wade through it to trace which, if any of the contributors had some particular disease of his own to describe, and, to finally discover that the objective of all their descriptions had been the same, though variously wrapped in haze, the old "irritable heart." But Sir J. Mackenzie's is selected for more pointed comment, as having earned for itself to the letter the same criticism which it had leveled at Sir J. K. Fowler's remarks—"vague, immature, insisting on the immaterial and neglecting entirely the essential." The microbes have been dragged in, yet not by the expert bacteriologist, highly trained in science, but by clinicians apt to be most positive in things they least understand, and by heart specialists apt to ignore that elementary physics are the essential for their speciality. Barr's own solution of the etiological problem is "hypertrophy and hyperthyroidism of both lobes of the thyroid;" and for these he also claims a casual relationship with trench foot. The treatment of hyper- and hypothyroidism should be well known to everyone. For the former he does not object to Dr. Florence Stoney's x-ray treatment. He had often used the same beneficially ten years or more ago, but not lately, as all his cases had been doing well without it.

HYPERTHYROIDISM. He owns that the enlargement is not always very apparent; this is often through lack of an efficient examination. The patient should recline, with head supported, on a gentle slope extending down to the waist. The lobes are then easily felt behind the muscles, and likewise any throbbing of the carotids. He quotes from a former paper his observation of two cases of Graves's disease due to prolonged iodine administration, rapidly cured by the substitution of a calcium mixture. The main themes for his discussion are thyroidism and its treatment, and the practical suggestions as regards the emotional factor (responsible for the predominantly female incidence, though it is also abundantly on supply in the trenches). He enlivens the truth that anticipation is worse than infliction, by quoting the Irishman's reply to the objection that any bullet traveling the way he had graphi-

cally described would have ripped his heart, "In faith my heart was in my mouth at the time."

Clinically, relative heart hurry, hand-in-hand with peripheral vascular relaxation, determine the cardiac, the nervous, and the circulatory symptoms. He calls special attention to the resulting increased expenditure of surface heat. This is a leading factor in the liability to trench foot. Chemically, he perceives a vicious circle of disturbed calcium metabolism as a direct factor of hyperthyroidism: "excessive output," due to hyperthyroidism, and resulting "deficiency" in the circulating calcium, which is not sufficiently supplied in the rations for heavy muscular work. He refers at some length to the experimental evidence as to the different actions exercised upon myocardial and skeletal muscles by the salts of sodium, potassium, and, in particular, of calcium. Free calcium ions in the blood and tissues are necessary for efficient contraction of muscles. Loeb, however, has shown that calcium can lower their irritability, even to the point of impeding rhythmical contraction. His own observations convince him that it reduces myocardial irritability. He also believes that its deficiency is answerable for common cramp. The misinterpretation of the wider effects of a curable heart ailment has led to its deplorable misdiagnosis as "neurasthenia," which is uncured because deemed incurable. He instances the syndrome, termed "splanchno-paralysis," by Albert Abrams, which is benefited by the tight support of an abdominal belt. A case of diagnosed "neurasthenia" was cured by his own prescription of a month's rest, liberal diet with plenty of milk food, and a mixture of adrenalin and lime salts.

HYPOTHYROIDISM frequently supplants the other trouble before the patient is drafted home. Its primary onset in men of iron nerve is illustrated by the case of an invalided officer reduced 4 stone in weight, with feeble, slow, intermittent pulse and other symptoms. He soon regained 2 stone and fitness for exercise, under a daily thyroid supply of 5 grains. When he reapplied to be sent back to the front his heart intermitted again; and he was rejected by the Board—which clearly had not included Sir J. Mackenzie. Barr's second prescription was to take one tablet every day of his life; to get some shooting in Scotland, and for a week before his next medical board to stop tobacco and take one tablet night and morning. He eventually passed with flying colors. Of course, the thyroid preparations should be active—too often they are not. They should contain 0.2 per cent. iodine, of which often there is not a trace. Free iodine may also be given to assist that which is organically found in the extract. Barr's favorite mixture includes calcium iodide, tincture of iodine, and the syrup of lactophosphate of lime. He is no longer depending, in thyroidism, upon the use of the x-rays which he thinks need caution.

Florence A. Stoney argues in the *Lancet*, 1916, that thyroid over-

activity is answerable for much of the dyspnea and tachycardia of irritable hearts; and that these symptoms might be successfully controlled, as the thyroid is eminently amenable to treatment, particularly when under the influence of Graves's disease. X-ray treatment can reduce an enlarged thyroid almost to any size, the symptoms disappearing *pari passu*. The derivation of Graves's disease from shock or alarm has often been recorded. Overwork or worry can lead to it in those inheriting a tendency to thyroid degeneration. Toxins can produce it, as shown by Sir A. Lane's operative cure of the symptoms by intestinal short-circuiting, and by cases of recovery after removal of teeth for pyorrhea. Stoney has noticed that after a complete oral sanitation, the gland responds to x-ray treatment much more quickly than when any oral sepsis has been allowed to persist. She believes that hyperthyroidism may exist without any goitre, and that exophthalmos is a late symptom. Therefore, she has been able to suspect cardiac and nervous forms of it, and to control it on the same lines as in declared Graves's disease in many cases of soldier's heart. Hyperthyroidism or Graves's disease is either primary, as in them, or it may be grafted upon a simple goitre of long standing. She has had good results in both these groups. The secondary cases develop late changes (in addition to the harmless proliferation and colloid degeneration), which are exactly similar to those in exophthalmic goitre. In addition to general and dietetic hygiene, the essential is to reduce the secreting activity of the gland (which can be reduced to any extent) to the proper degree, which avoids all risk of myxedema. Several sittings are necessary; they are usually spread over two months. The heart's action is the first to respond, even when absolute rest is not enforced. By filtering, she is now able to administer larger doses without any dermatitis and with quicker results. The usual symptoms: (1) fine tremor; (2) associated excess of perspiration; (3) nervousness, dread, and jerky movement; (4) pulse frequency steadily above 90, and (5) cardiac irritability, are sufficient indications for this helpful treatment which entails no risks.

Baar¹ mentions two cases in support of the latency of hyperthyroidism, without any ocular or thyroid change or even tachycardia, and of the curative effect of the x-rays. One patient had been treated for asthma, the other for cardiac insufficiency. The latter was able within two weeks "to walk twelve to fifteen blocks."

A Pituitary Control over "Secretory" Hyperthyroidism is inferred by J. Pal in the *Deutsche medizinische Wochenschrift*, 1915, from the suppression of the symptoms in 16 cases (including 3 of "inoperable" exophthalmic goitre which by that means were rendered amenable to a successful operation). On healthy thyroids, the subcutaneous injection of infundibular

¹ Medical Sentinel, December, 1915.

extract is inactive, but a simple goitre may increase under its influence. This identifies the difference between the normal secretory activity of the vesicles and the morbid thyrotoxin production. The pituitary check is limited to the latter. In two cases the trouble was traced to iodine medication. In one of them a man aged forty-four years, with arteriosclerosis, the Graves's symptoms were allayed, but vascular spasms developed, ending in fatal myocarditis from local gangrene in spite of the suspension of pituitary treatment. We should avoid its indiscriminate use in arteriosclerosis with weak heart, as its individual reaction is so variable.

The Prognosis in Auricular Fibrillation. H. E. B. Pardee¹ takes a hopeful view, from his favorable experience in seven cases which had exhibited the continuously irregular type as distinct from the discontinuous sinus arrhythmia. That type, unless amended, is inevitably progressive owing to the permanent curtailment of the diastolic rest by a quickened rate. The secret of success is in the steady administration of a sufficient supply of digitalis. If the heart's beat can be kept below 70 per minute, there may be, as in his patients, no recurrence of the failure. They had all presented serious complications. Their subsequent fitness for considerable exertion proves that the irregularity is not *per se* the element of gravity in the prognosis.

THE TREATMENT FOR AURICULAR FIBRILLATION is cardiac rest and diet, avoidance of all nervous stimulants, such as tea, coffee, alcohol, strychnine, etc., and "the sufficient" dose of digitalis. This has to be carefully determined by ascending dosage. The first day 5, 10 and 15 drops are administered at the end of the three meals; next day, 20 after breakfast, and, failing any effect, 25 at noon; the third day, 30 drops in the early morning if the rate is still above 90. As soon as the cardiac frequency and discomfort are allayed, only two daily doses of diminishing strength are required for one or two weeks. In renal inadequacy, when oliguria results, digitalis must be stopped at once. In other cases, too, a persistence of cardiac discomfort after subsidence of the frequency and of the fibrillation means an overaction of digitalis and its immediate suspension.

The Treatment of Arrhythmia. G. Rummo's² comprehensive review refers to the indispensable estimation of myocardial capacity by the exertion test, and by the pharmacological tests (pilocarpin (0.0075 to 0.01 gm.), to stimulate the vagus; atropin (0.001 gm.), to paralyze it; and epinephrin (0.001 gm.), to stimulate the sympathetic), allowing a day's rest between each. He is not wedded to the conception of vagotony. Its drug tests need caution and a critical mind. Central or peripheral vasoconstrictors, such as strychnine, epinephrin, the

¹ Journal of American Medical Association, December 11, 1915.

² Riforma Medica, November 27, 1915.

nitrites, and amyl nitrite may throw light upon the causation of the arrhythmias. Their new names testify to our increased knowledge. But the syndromes are the same as before. They are based upon a combination of individual factors apt to vary with each case, and sometimes calling for paradoxical treatment. A bradycardia may need digitalis or strophanthus in spite of their tendency to favor heart block, if a greater danger be anticipated from myocardial failure.

Heart Block. E. Lea records in the *Lancet*, 1915, vol. i, several unusual features in his case of complete block: a persistent and high idioventricular rate of 50 to 60, with occasional irregularity; a period of sinus bradycardia, with rate of 51, while the ventricular rate was higher, and an auricular tachycardia of 200 after a 50-grain injection of atropin sulphate. M. E. Cottin's two cases of permanent bradycardia, one of them neurogenic, the other organic, recorded in the *Archives des maladies du cœur*, 1915, atropin was injected. In the first, a woman aged thirty-four years, with slight goitre, 2 mg. invariably unblocked the heart. She declined thyroid resection, not feeling seriously disabled

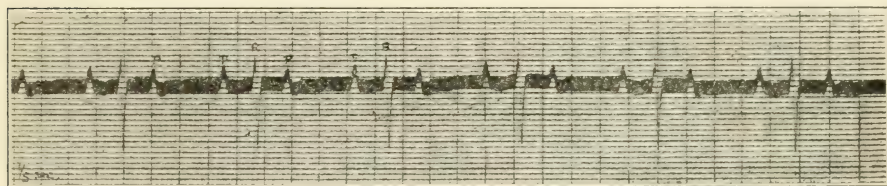


FIG. 5.—Electrocardiogram (Case 1).

by her abiding symptoms. In the other patient, a man of seventy-two with gastric cancer and a heart rate of 40, atropin was ineffectual, perhaps owing to "the senile insusceptibility to the drug." Definite changes were found in the bundle of His. The therapeutical contrasts in these cases are instructive.

CONGENITAL HEART-BLOCK. Two instances are reported by T. R. Whipham,¹ being the first hitherto published. Zahorsky's case of bradycardia in an infant of fifteen months was published soon after, but no cardiographic evidence of heart-block was recorded. A loud systolic murmur was present as in his own cases (probably due in all three to a gap at the upper part of the septum). Whipham's electrocardiograms were conclusive. This one, from an infant of eighteen months, shows a 2 to 1 heart-block, of regular rhythm, namely, one perfect cycle (P., auricular, and R., ventricular contraction), followed by one isolated auricular beat. P., without any ventricular beat, and with double length of pause.

¹ The British Journal of Children's Diseases, November, 1915.

EPINEPHRIN IN HEART-BLOCK. J. Heitz's¹ paper dealing with auriculoventricular dissociation (partial, complete, or by simple heart block), raises the question as to the share of the cardiac sympathetic fibres, which recent experiments have divested from any participation in impulse conduction. Some "directive" influence cannot be denied them, in the light of Routier's striking observations on the restorative efficiency of epinephrin in canine experiments. Dissociation of the auricular beats (140), and of the ventricular (55) having been produced by forceps compression of the bundle of His, an epinephrin injection restored them both in twenty seconds to a level rate of 115, but only temporarily, the disparity soon relapsing (120 to 42). Some of the experiments, with preliminary ablation of the first two thoracic ganglia, restricted the field to the intracardiac nervous apparatus, and the epinephrin influence to the terminal sympathetic fibers. Heitz concludes that its accelerating action is by stimulation of the sympathetic coronary plexus terminals, and its block-suspending action by some stimulation of the sympathetic fibers in the bundle sufficient to restore its wave-conduction, provided this had not been completely destroyed. He also claims greater recognition for a nervous coöperation in the mechanism of dissociation. The nerve factor may operate extracardially, when of the nature of vagus hypertonus, or intracardially when identified with a depressed sympathetic function. The therapeutic value of epinephrin in heart-block is henceforth clearly established.

The Action of Digitalis has been studied both clinically and with the electrocardiograph by Alfred E. Cohn.² Slowing by delayed sinus impulse is produced by it only in hypodynamic hearts, but some delay in conduction time, up to partial block, may result in all. It becomes manifest within forty-eight hours, lasting about two days. The question as to its beneficial action is undecided. He has been able to identify the frequent though little-known occurrence of a dissociation of the beats of auricle and ventricle, occurring without any apparent uncoupling of their rates. In fever, although the frequency is not reduced, digitalis may help in other ways, as fever does not seem to induce any other departure from the regular mode of action under a normal temperature. Marked slowing occurs in cases of transient fibrillation or flutter. Digitalis did not raise either the systolic or the diastolic pressure. It failed to produce diuresis except in the presence of an edema caused by cardiac failure.

Adrenalin. Some uncertainty still prevails. Otolaryngologists, trusting to Brünings, regard it as safe: "The subcutaneous or intravenous injection paling the mucous membrane, raising high the blood-pressure, and often restoring the heart beat where other stimulants

¹ Arch. d. mal du cœur, February, 1916.

² Journal of American Medical Association, October 30, 1915.

had failed." Anesthetists, however, have lost their implicit trust in it. Watson has even lately described it as dangerous, and never to be used as a general blood-pressure elevator. He finds that, in analogy with aortic reflux, it raises the systolic, and lowers the diastolic pressure, greatly. On the other hand, Cushny recognizes its accelerating and augmenting action upon the sympathetic heart nerves; that effect recurring and persisting after a varying period of reflex vagus inhibition. The mystery of its control over asthma is cleared by his statement that "its intravenous injection dilates the bronchi widely; an effect especially noticeable when they had been previously contracted by pilocarpine and physostigmine. This is not the same as the dilatation caused by atropin; it is due to adrenalin stimulating the terminations of the bronchial sympathetic fibers, and thus causing a relaxation of the muscle." A scare has been raised against its habitual use, from the arteriosclerotic results of experiments on animals in Germany, but most asthmatics seem inclined to take that risk. Another clinical use of it has been suggested and practised by Milian, namely, to counteract the depression from salvarsan injections by an immediately preceding intramuscular injection of 1 to 2 c.c. of the 1 to 1000 solution.

The Oculocardiac Reflex; and the Vagus Influence in Extrasystolism. G. V. Ferralis and C. Pezzi (Pavia) believe that eyeball pressure stimulates the vagus more effectually than its cervical compression. They are using it for the study of extrasystolism, and for its control by atropin. The extrasystoles induced by pressure may occur isolated or in series. This suggests a derivation from some myocardial condition resulting from vagus overaction, and that atropin might be the best means to subdue or to prevent them. The January, 1916, number of the *Archives des maladies du cœur* also contains a practical paper by M. Roch (Geneva) on "Chronic Coffee Intoxication," and J. Heitz's paper on the "Oscillometric Demonstration of Considerable Variations in the Readings from Symmetrical Arteries in Health."

THE HEART-SLOWING OCULOCARDIAC REFLEX is suggested for early trial in paroxysmal tachycardia by C. Lian. His only experience was a failure; in a severe case which was also refractory to ipecacuan, to swallowing large cachets, etc., and which only yielded to intravenous digitalis—hardly a fair case for testing delicate mechanisms.

Direct Intracardiac Injections (epinephrin, with digitalis or strophanthus) have been used as "resuscitants" in 3 cases reported by Szubinski.¹ The flagging heart was much stimulated for a while. But life was not saved. He thinks it probably might be, sometimes. The punctures could not be detected at the autopsies.

The Therapeutics of Magnesium Chloride are both medical and surgical. On the strength of the data from Delbet's experimental research, Rosen-

¹ Münch. med. Wchnschr., December 14, 1915.

blith injected it subcutaneously in 1913 with good results in a very painful case of deforming rheumatism. Last September he has reported most favorably to the Académie de Médecine on its use as a dressing for wounds. The striking results of its subcutaneous injection in the wounded bear out the recent experimental demonstration that it raises to opsonic index in a remarkable degree, and also the production of antibodies.

HEMADENOLOGY, DIATHESES, AND SYNDROMES

Hemadenology. Sajous's masterly exploration of this vast subject which is common to all, and special to none of the sections of PROGRESSIVE MEDICINE, continues to enlist our grateful admiration. Sir Edward A. Schafer's Work on "The Endocrine Organs," 1915, contains the following paragraph on its nomenclature, which it may be serviceable to reproduce: "Since the most characteristic feature of the action of these substances is their resemblance to the action of drugs, such as the vegetable alkaloids, I propose to employ for these specific substances the general title 'autacoid substances,' or, simply, 'autacoids' (*αὐτός*, self, and *ἄκος*, a medicinal agent or remedy). I would accordingly define an autacoid as a specific organic substance formed by the cells of one organ, and passed from them into the circulating fluid to produce effects upon other organs similar to those produced by drugs. Such effects are either in the direction of excitation, in which case the endocrine substances producing them are 'excitatory autacoids' and would come under the expression 'hormones,' or in the direction of restraint or inhibition, in which case they are 'restraining' or 'inhibiting autacoids,' and would be classed as 'chalones.' The action of an autacoid may therefore be described as 'hormonic' or 'chalone,' according to the kind of effect it produces."

"**Dyshormonism**" has recently been used to designate clinical disturbances in the nature and mutual play of the internal glands and secretions. O. Kolnstamm,¹ describes the "conclusive" neurasthenia of combatants as a functional result of neuromolecular disturbances, comparable, he thinks, to the magnetizing polarization of iron. This might also apply to the every-day production of exophthalmic goitre, and also asthma, which he was able to cure or benefit by systematic treatment with antithyroidin, hypophysin, and epinephrin, either singly or in combination. Civilian practice furnishes many other instances of "dyshormonism," such as insomnia, vasomotor angina, dysmenorrhea, and what not. In connection with the heart he contrasts the constricting action of epinephrin upon the coronary vessels with the dilating action of hypophysis extract. The use of this novel

¹ Therapie d. Gegenwart, September, 1915.

term illustrates the tendency of our rapidly expanding vocabulary of complexes and syndromes to confer, sometimes prematurely, the qualification of "definite mechanism" upon conceptions still in the hazy stage of early evolution.

The Endocrine Glands, and Development. In a recent editorial (February 19, 1916) the *Journal of the American Medical Association* touches upon some vital points. By feeding tadpoles with thyroid, Guder-natsch produced "organic differentiation" at an amazing rate—perfect frogs of minute size. On the other hand, thymus-fed tadpoles grow apace in size and weight, without any precocious shaping. Abderhalden has extended that inquiry. He finds the same results from glandular supplies when predigested to a complete extinction of the protein test. This conclusively dissociates the active principles from the protein molecule, and probably from its more complex derivatives. Differing combinations of the various endocrine principles thus supplied have led to bizarre results, opening a wide field of speculation. Meanwhile, it is of much clinical value to know that the active principles survive digestion, and that, for tadpoles, the activation of organic differentiation is vested in the thyroid principle, and that of mere nutritive increment in the thymus principle.

Pilous Adiposity. Fröhlich's classical "Syndrome of Obesity," with a genital dystrophy and a dry skin, does not correspond with the features of the case reported in 1915 by W. M. Kraus in the *American Journal of the Medical Sciences*: the skin was not dry, and there was a marked increase in the growth of body hair. The patient did not begin to store his fat until he was twenty-seven years of age. But in four years his weight had increased from 150 to 282 pounds. Kraus therefore thinks that a fresh syndrome should be added to those previously described under obesity.

"General Asthenia *versus* Neurasthenia" is the keynote in Jones's¹ suggestive paper on the rôle of fat deposition in the cure of abdominal ptosis, intestinal stasis, and the general asthenic state. Can they be dissociated into any genuine contrast? The neurasthenic is fundamentally a "constitutional asthenic." While any general asthenic cannot escape from a denutritive nerve deterioration into more or less of a "neurasthenia." The causal mechanism is unquestionably organic; but the author introduces into it the psychical factor. Although this is imponderable, it undoubtedly turns the scale. Undoubtedly, then, it must belong to both sides of the nutritive reaction. By attributing to the psyche a directive influence he declares himself a "spiritual" pathologist. In that acknowledged spiritualism our pathology is in advance of our physiology. This too, must sooner or later gravitate away from exclusive materialism. Having laid down the definition that

¹ Surgery, Gynecology and Obstetrics, 1915.

neurasthenia is a psychical weakness of the soul and of the will more than of the body, and asthenia a physical weakness of the body more than of the soul and will, he enters upon an able discussion of plain organomechanics, in which we would heartily have followed him had space permitted.

Stiller's Asthenia Universalis Congenita is an unpromising extreme type of slender skeleton, narrow pelvis, and ill-slung mesentery. Quite different from this is the simple asthenic disposition of delicate, healthy children. Its results, which become manifest at puberty and after, are controllable. They should be checked in early childhood and adolescence. That tendency is worth searching for early, if Albu was right in registering ptosis in nearly one-third of the newborn (male, 4 per cent., female, 27 per cent.); and before puberty, in 11 per cent. of boys, and 44 per cent. of girls. Our greatest need is an early and systematic physical overhauling of our growing citizens. Jones's ambitious scheme for their reconstructive treatment is: (1) to regulate the bowel, by diet and mechanical methods (including, if necessary, deobstructive surgery); (2) to encourage the deposition of extra-peritoneal fat; (3) to remold and develop the body, on Goldthwait's structural lines; (4) to educate a tonic habit of body and organs, in particular of the stomach. Intra-abdominal fat is an indispensable packing for dangling organs, as well as a nutritive reserve. At the same time, when contrasting with Dubois and Déjérine's psychotherapeutic methods, the German fattening "mastkur," he concludes that this is illogical both for the psychasthenic whom it cannot reëducate psychically, and for the asthenic whom it cannot physically strengthen.

In his *Anatomical and Mechanistic Conception of Disease*, Joel E. Goldthwait¹ is guided by a recognition of the infrequency of a "perfect" structural type, and of the frequency of modified types. He traces the individual differences in the response to the functional stress of life and of disease, to that structural difference as a basis. The two main types which he singles out are: "the broad and heavy herbivorous," which is more subject to gout and easily poisoned by too much meat, and "the slender and delicate carnivorous," more liable to splanchnoptosis, for whom red meat is not poison but sound food. The practical importance of realizing that predominant influence of structure is for prevention. The "slender types" which prevail in childhood would evolve, unless properly nurtured, into a still weaker physique. These are, nevertheless, the more impressionable, quick-moving, and quick-thinking types, and also the most prolific. A stronger, as well as a finer race would result from their more careful and discriminating early management.

¹ Boston Medical and Surgical Journal, June 17, 1915.

Overactivity: A Potent Etiological Factor in Nervous Diseases. Alfred Gordon's paper in the *New York Medical Journal*, February 26, 1916, attributes the tissue localization of any humoral morbid influence to the exhaustion and permanent fatigue of those tissues which are continuously worked and relatively overworked. Thus, in tabes the first stress falls upon the posterior roots and neurons serving the lower extremities because they can never rest from their active sensory function. Sometimes the ataxia begins in the upper limbs, probably because overworked. In some tabetics of sedentary avocations, the eye, if overworked, or if perhaps constantly overstimulated by the actinic rays of a too brilliant light, will develop much earlier symptoms than in the rest of them. He concludes, from his study of 187 cases of all kinds, that similar individual variations in localization may be traced to tissue exhaustion (under denutritive influences) in lead palsy, poliomyelitis, progressive muscular atrophy, and other affections. Edinger went further than Weigert and Roux, who had pointed out that the level equilibrium of energy common to all our body cells is distributed by malnutrition to the detriment and atrophic shrinkage of those which are worst nourished, and to the advantage of others able to make up for them by expanding and proliferating, he sought to prove that the overworked and underfed cell, being less resistant, is hurried into degeneration by the vitality of the resisting ones. Two sets of rats were rendered profoundly anemic (as in pernicious anemia) by pyridin injections. Those kept at rest developed no spinal-cord lesions; in all the others, worked to death on the treadmill, the cord showed degenerative changes. The same principle might be said to apply to the localization of syphilis and of tubercle, and also of acute gout where the great toe suffers because harder worked than the other toes, and likewise of chronic arthritis where the hip is most often affected, and the thumbs more often than the other fingers, and where Heberden's nodules are apt to spare the ring finger which is the least active of our digits. Its practical bearings upon prophylaxis are obvious. The early treatment of the chronic toxemias should be associated with a cessation from any occupational overstrain. This might, for instance, enable a potential general paralytic to ward off a late cerebral recrudescence of his syphilis.

Scrofula; the Exudative Diathesis and Tubercle. Czerny's conception of the exudative diathesis is a congenital tendency quite apart from tuberculosis as a primary factor, to exudation from the skin and mucous membrane, together with some hyperplasia of the lymphatic system. H. Schelbe¹ contends that this is also the essence of scrofula. Eliminate from scrofula its accidental tubercular localizations in bone, skin, and glands; there still remains the scrofulous habit and facies,

¹ Deutsch. med. Wchnschr., September 23, 1915.

and these are in reality those of the exudative type. Scrofula, then, calls for a treatment of its own, which, if successful, might largely control the tubercular process. Surgeons are realizing that the constitutional and conservative treatment of enlarged glands, with the help of radiotherapy or of heliotherapy, is better than their removal. Rollier has shown that an extensive surgical interference with scrofulous joints or bones is often unnecessary, and too often disastrous, and should be avoided except as a last resort.

THE CONTROL OF THE EXUDATIVE DIATHESIS IN INFANCY BY ATROPIN. Krasnogorski's method is based upon Eppinger and Hesse's view that the diathetic manifestations are due to an infantile vagotonia or increased vagus tone; and upon his own observation that atropin is a cure for them, while singularly free from any toxic effects in infancy. Leopold's¹ results in 10 infants treated for severe eczema, bronchitis, or asthma are reported as strongly confirmatory. In one case only was there any indication to reduce the dose of his solution of sulphate of atropin in water (1 grain in 480 drops; of this, 3 drops daily, increased by 1 drop daily up to 30 drops, or $\frac{1}{16}$ grain, is a daily dose. This was kept up for one or more weeks with obvious subsidence of the manifestations, and then followed up by diminishing doses for a few more days or weeks. One infant, while better of its eczema, succumbed to an intercurrent bronchopneumonia.

Intensive Atropine for Infantile Pylorospasm. K. Ochsenius² publishes his cure of two breast-fed infants of four weeks by continuous large doses of atropin (up to 3 drops of a 0.01 in 10 solution, three times daily). This remarkable infantile tolerance is a new departure. It gives the means of excluding genuine congenital "stenosis," and of curing promptly the spastic cases. The reputed maximum daily dose for adults is 3 mg. One of the infants took 1.2 mg. for a whole week; in the other, up to 0.9 mg. daily had been administered intermittently over a period of ten weeks. They both recovered.

Calcium as a Moderator of Inflammatory Reflexes. The inhibition of inflammation by reflex-arc interruption is Spiess's "theory," championed by T. Silvestri, of Naples, since 1912, in last year's *Riforma Medica*, in special connection with acute meningitis. It derives support from the clinical "fact" (unexplained but universally noted, and particularly in thoracic affections) of the efficiency of counter-irritation. If, through a pervious nervous arc, a peripheral stimulus can convey relief to a deep-seated inflammatory focus, then we can conceive that the reflex nervous path might likewise conduct into the depth, and focalize inflammatory stimulations. The theory goes further than this when it assumes that focal inflammatory action cannot be kept up if reflex

¹ American Journal of Diseases of Children, October, 1915.

² Deutsch. med. Wchnschr., December 16, 1915.

conduction fails to maintain it. From that basal conception, and from Stroganoff's prophylaxis of eclampsia by chloral and morphine, Silvestri has developed his "inhibitory treatment" (by calcium bromide and lactate 10 gm., and chloral 2 or 3 gm., with 1 or 2 morphine injections daily for the two first days). Other observations are quoted. An attenuation of the diphtheria toxin has been obtained by Calcaterra by adding calcium to the culture. H. H. Meyer has found that, in dogs previously treated with calcium salts, the customary inevitable pleuritic effusion did not result from diphtheria toxin injections. Müller and Saxl have delayed the return of chronic tubercular pleural effusions by calcium administrations. Lastly, Silvestri's experiment convinced him that prolonged calcium treatment is remarkably efficacious in controlling the exudative diathesis. As this diathesis is characterized by intense inflammatory reactions to trivial causes he claims for calcium a quasi-inhibitory power over exaggerated morbid reflex activities. We might well utilize that therapeutic experience, even if not quite clear as to its mechanism. In our treatment of phthisis it is worth remembering that small doses of calcium have been shown by Hamburger and de Heau to raise the phagocytic efficiency of leukocytes.

Acidosis and Alkalosis. "Acidosis" connotes the clinical result of an abnormal metabolism, with complex acid fermentations which diminish the normal alkalinity of the blood and juices. As a *clinical syndrome* it was first identified, in advance of its biochemistry, in diabetic coma, its most extreme development. We are now aware that the same acid strain underlies, at various degrees of attenuation, a series of morbid or submorbid phases for our clinical diagnosis. Much less attention has been concentrated in the opposite direction upon the alkaline deviations of metabolism, which doubtless occur. "*Alkalosis*," apart from the artificial results of an excessive alkaline supply, is not specified among the symptomatic syndromes. Nevertheless we have long been administering acids with conspicuous advantage in a variety of conditions; though never on the intensive plan resorted to in our alkaline treatment of the higher degrees of acidosis.

In *acidosis*, as remarked by Edgar Stillman in his paper on the Fasting Treatment for Diabetes in the *American Journal of the Medical Sciences*, April, 1916, our urinary tests can measure the acid excreted, but not its unexcreted accumulation. This can only be ascertained from the bicarbonate coefficient of the blood, by testing the power of the plasma to bind CO_2 . A daily determination of the acidosis enables us to conduct the fasting treatment with safety and success.

THE REDUCED BLOOD ALKALINITY OF KALA-AZAR AND CHOLERA. L. Rogers and A. J. Shorter¹ give a technic for its estimation. In 16 cases they found it proportionate to the severity of cholera. This

¹ Indian Journal of Medical Research, April, 1915.

justifies the prescription, current for several years past, of potassium citrate, 40 grains, and liquor ammonii acetatis, 4 drams. They insist that diuresis of itself reduces the alkalinity. Intravenous sodium bicarbonate injections raise it, of course. But it is not surprising that, in fatal uremia, where it may be reduced to $\frac{1}{1000}$ of the normal, owing to the almost complete suppression of urine for two or three days, even that remedy should fail.

Calciuria is a Better Name than Phosphaturia, according to H. Kleinschmidts,¹ for the well-known syndrome always associated, in children, as it is in the adult, with a highly nervous temperament. Is the faulty calcium metabolism primary, or the result of an inherited nervous instability? He inclines to the latter view. At any rate, the diminution in urinary acidity and, as has been alleged, in the urinary colloids ends in a steady drain of calcium. The indication is not to reduce, but to increase, the calcium supply, under a strict therapy of rest and of altered surroundings. Great improvement results, too often, however, merely temporary. This points to the need for a more prolonged treatment of the nervous factor.

Metastatic Calcification, a rarely recorded pathological process of reabsorption of calcium from the bony skeleton and of its deposition in soft tissues, is instanced by H. Gideon Wells in the *Archives of Internal Medicine*, April, 1915, in a case of myelogenous leukemia with softening of bone. The metastatic deposits were most marked in the left myocardium and in the intima of the coronary arteries, and also in that of the pulmonary veins which prevented the lungs from collapsing. He regrets that selective localization to tissues containing less CO₂ than any others as indicating that a carbon dioxide surcharge in the blood is one of the essential factors in the transportation.

Vagotonia. A clinical picture of the constitutional stigmata is given by W. Lubinski in his enumeration of the more obvious features; flushings and palings, sudden perspirations, blue hands, or cold and clammy palms, dull eyes with small pupils, drooping corners of the mouth, frequent swallowings or sighings. The purpose of atropin is to tone up and steady the overirritable vagus system. The constitutional bias is inevitably slow to cure. The dosage of atropin needs careful graduating at the start and at the finish. This also uses arsenic, another useful nerve tonic.

A comprehensive view is taken by H. Eppinger and L. Hess, in their monograph on vagotonia, a clinical study in visceral or vegetative neurology. They postulate here, as in the liability to status thymicus, a primary constitutional inferiority which nothing can remove. Our clinical endeavors are limited to the control of its spastic manifestations, and, for this, atropin is unrivaled. It would seem to supply to the

¹ Berl. klin. Wehnschr., January 11, 1915.

blood a working agent which it lacks, to influence in opposite directions the activities of the sympathetic and of the vagus. They hold the endocrine glands mainly responsible for that deficiency. The efficiency of epinephrin in various spastic conditions of the autonomic system bears out that view. Chromaffin insufficiency has been demonstrated in some types of endocrinopathy. The same individuals also present anomalies in their lymphatic system which link up the status thymicus with the vagotonic constitution. On that view, the therapeutic scope of atropin is unlimited. It includes, besides asthma and other respiratory affections, gastric crises, and minor functional disturbances, the gastric symptoms of infusion of digitalis and of gastric ulcer, and also the extrasystolic arrhythmias, and the cardiac disturbances from digitalis. In short, atropin is the best remedy for all vagotonic and spastic manifestations. It should be tried in all conditions presenting a more or less vagotonic complexion.

J. de Monlevade's¹ comments on the 6 cases in which he has tested atropin, pilocarpin, and epinephrin on the sympathetic and pneumogastric systems are much to the same effect. He found the epinephrin and the pilocarpin tests to be consistently true in their opposite reaction. According to him, the "status vagotonicus" impresses upon individual cases of the most varied affections a special stamp with similar symptoms of cardiac, respiratory, alimentary, and vasomotor disturbance. He instances neurasthenia, epilepsy, hysteria, and also tuberculosis, chief among our infectious diseases; but Addison's disease and Graves's are its most telling exponents.

SHOCK, COLLAPSE, AND HEART SEIZURES.

Shock. Our English monosyllable provides a unique and alone complete description of both cause and result. Any substitute for its verbal simplicity breaks up the unity of the drama it seeks to explain. "Shock" is an overwhelming "insult," irrespective of the nature and of the site of its infliction. "Shock" also means the systematic universal prostration of the economy thus overwhelmed. The mechanism of that result must be sought at the seat of its government, at the headquarters from which our nervous system animates, directs, and coördinates all the vital processes of our life, not merely physical, but, above all, psychical. Crile's conception, less materialistic than any other in the fulness of its recognition of that predominance, is *a priori* the most comprehensive of all. *Collapse* may be merely local; for instance, that of our knee when badly jarred. A swoon, the purely circulatory cerebral result of the collapse of a badly jarred heart, demonstrates the essential difference between shock and collapse. The only "jar" that can deter-

¹ Brazil-Medico, April 8, 1915.

mine the universal and systematized collapse which we identify as shock, is that which shakes our vital innervation to its foundation—the brain itself, as we venture to think in agreement with Crile. The mechanics of his theory have been much criticized. But its broad principle—the overwhelming of the spirit of our material existence—is unassailable. All other views can only be partial. Howsoever correct they may be in the detail of their experimental facts, or successful in the application of their therapeutic suggestions, they must inevitably fall short of the great etiological unit. An admirable résumé on shock has lately been given editorially in the *Journal of the American Medical Association*, May 6, 1916. It contrasts with Crile's theory Y. Henderson's acapnia theory, and J. F. Corbett's theory of a primary suprarenal exhaustion, and ably discusses their methods of treatment.

In common with strychnin, atropin has had a period of empirical use for the prevention or treatment of collapse in the acute infective diseases, namely, before it was known that atropin contracts the vessels in the splanchnic area while tending to dilate those at the periphery. The need for such an agent is now recognized; it has recently been emphasized by the results of Meyers and Wallace's investigations. They find that the poison of diphtheria, besides damaging the intestinal epithelium and the capillaries of the liver, determines a great relaxation of the bloodvessels in the splanchnic area.

IN SHOCK, THE VALUE OF THE VASOCONSTRICTORS is questioned by J. D. Mortimer in the *Practitioner*, 1915. He believes in vasodilating agents (ether (open), amyl nitrite, brandy, and saline infusion); and in other measures such as surface heat, reversed body inclination, abdominal pressure, and, if necessary, artificial respiration with oxygen, and heart massage. Injectional vasoconstriction being incapable of regulation is a hazardous undertaking where the urgencies are so great, and the trembling balance between cardiac power and vascular resistance beyond our precise estimation.

GLUCOSE AS A PROPHYLACTIC FOR SHOCK is strongly advocated by Burnham in the *American Journal of the Medical Sciences*, 1915. Its subcutaneous use was first recommended by Barlow in 1895, and systematized in 1911 by Kausch, who prescribed a 4 to 5 per cent. solution (or intravenously a 7 per cent. solution), with careful sterilization. The urine excretes only 2 to 5 per cent. of it; the rest, as shown by Vezar and von Fejer, being consumed per heat production and for restorative energy for heart tissues, while diminishing acidosis and the tendency to postoperative vomiting, and also neutralizing poisons, such as the conjugated glycuronates. In 2 or 3 liters, from 90 to 210 grams may be administered in twenty-four hours without more pain or discomfort than from saline solution which this far excels in nutritive value. It can also be supplied by proctoclysis during the operation, and by the drip method after. Secretan had previously insisted upon the value

of some digestible or predigested carbohydrate feeding two hours before the anesthesia, and an abundant carbohydrate alimentation during the preceding twelve hours. A sufficient store of food is an obvious indication; and this is the only one clinically available.

The Therapeutics of Sugar are a growing practical chapter, well worthy of a cursory sketch. *Infantile* starch-dyspepsia, and many other ailments, have been greatly benefited by Nobecourt and Nadal by adding to the diet a large proportion of saccharose (up to 10 per cent.). In old age, cane sugar is well known to be the simplest of assimilable ailments. J. F. M. Gomez reports from Buenos Ayres his remarkable results, nutritive, diuretic, and diagnostic, obtained at La Pitié in Paris from intravenous 30 per cent. *infusions of glucose* (500 c.c.), in addition to the ingestion of 150 gm. dissolved in 500 c.c. of water. G. Jahnsen-Blohn writes from Upsala, that the blood-content behavior is strikingly different under *oral* or *rectal* dextrose administration in isotonic solution. It rises immediately after the ingestion of 10 gm. both in healthy and in diabetic subjects. But there was no appreciable use in either, after the rectal injection of 30 gm., although the absorption of the sugar by the rectum was proved beyond question. The influence of muscular work upon the blood content has been studied by Moraczewski in healthy and in diabetic individuals; with the practical conclusion that for the same amount of sugar and of exercise which leaves the blood content stationary in the healthy there is an increase in any subjects inclined to glycosuria. This supplies a ready means for the detection of any latent tendency to glycemia.

In *war surgery*, Fackenheim and others have had excellent results from powdered crystallized sugar as a dressing. There were no contra-indications or bad effects in his 800 cases. The wound is dusted with it, and shows striking increase in granulation and in epithelial regeneration. The dressings were renewed every other day.

In heart therapy, cane sugar has already secured a place in practice as a supporting food and as a tonic.

Laryngeal Ictus. That name identifies the suddenness of the stroke of unconsciousness and its laryngeal and apparently purely reflex provocation. Its mysterious etiology is briefly discussed in the *Journal of the American Medical Association*, 1916, *à propos* of E. Jeanselme and C. Lian's two cases of "ictus laryngé des bronchitiques." Bronchitis does not explain all cases; the exciting spasm of cough may be due to swallowing the wrong way. A great problem is that of its almost unreserved limitation (revealed by Bedos's compilation of 43 cases in non-tabetics) to the decennia between 30 and 60; and of the prevailing immunity of that period which is most prone to manifest any individual excess of reflex irritability, and is least prone to structural changes. An epileptic tendency does not develop late but rather early in life. The organic changes, if any, are not of the larynx; might they perhaps

reside in the bundle of His? To this it might be objected that the liability to the attacks is not, as a rule, conspicuously progressive. The fact has to be noted, that sudden unconsciousness, which means practically sudden cerebral anemia, is more plausibly attributable to cardiac asystole than to a lightning spasm of the cerebral arteries. Jeanselme discards any circulatory cerebral disturbance as a mere accessory. But he does not substitute for it any definite mechanical hypothesis; dwelling mainly upon the undue excitability of the pneumogastric system, and upon the clinical indication to reduce it by small daily doses of atropin which also moderate the cough. Another mysterious feature, consistent with a functional cardiac disturbance, is that the unconsciousness, never exceeding one or two minutes, is immediately and completely recovered from, with undiminished fitness for exertion; though a transient malaise and vomiting may sometimes occur. His two patients were hard drinkers with short necks, and facial congestion. The premonitory tickling in the throat, and the cough dizziness should warn those liable to attacks to lie down at once before they fall.

The Nitroid Crises of Milian from Intravenous Salvarsan or Neosalvarsan. The *Therapeutic Gazette*, 1915, p. 819, reviews Beeson's paper on these dangerous and alarming attacks. They are similar to those from amyl nitrite inhalation (facial congestion and turgor, rigors, perspiration, nausea, vomiting, etc.). In addition, however, there may be agonizing dyspnea and precordial pain, and sometimes syncope. Other sudden attacks, which have been identified with serous apoplexy, occur three or four days after an intravenous injection. Adrenalin is recommended for warding off these risks, at a minimum dose of 1 mg. as an intramuscular or subcutaneous injection, ten minutes before the salvarsan. The intravenous route is reserved for the treatment of the actual crisis.

In cases of *Atypical Sunstroke (with or without Subacute Meningitis)* of gradual development from prolonged working in the sun (extreme depression, headache, bradycardia or arrhythmia, vasomotor disturbance, increased cerebrospinal fluid pressure with tendency to stupor, feverishness, etc.), C. Lian calls special attention, in last year's *Presse Médicale*, to the prominence of the signs of myocardial weakness. That feature is so manifest in this atypical syndrome that, from collateral observations and heart testings, he is inclined to regard it as a "cardiac form of sunstroke."

The Heart's Action in Angina Pectoris. H. E. Hering contributes two papers to this subject.¹ In the second he argues that ventricular fibrillation is the factor of the sudden death. This could only be proved by

¹ Deutsch. med. Wehnschr., September 23; Münch. med. Wehnschr., November 2, 1915.

electrocardiography, which is never available in the urgency of the attack. Were that proof obtainable it would demonstrate that death was in reality not from paralysis of the heart, but, on the contrary, from an excessive production of motor impulses. He therefore turns to pathogenic influences for a justification of his main assumption. Among the predisposing factors are a diminished lumen of arterial supply which impairs the local myocardial function, any hemorrhage or trauma within that district, and the general anesthesia. The direct exciting factors are the local ischemia, the local action of toxins, and of CO₂, and, above all, an heterotopic impulse production excited to its highest degree. Temporary anemia is prominent among the known pathological data, and is probably the determining agent, for experiments have shown that ischemia predisposes the heart to fibrillation, and that anemia of the heart precipitates its onset.

His first paper was concerned with the action of morphin. He does not intend to discard its valuable help; but warns us that its dosage needs most careful supervision. The response of a diseased heart to morphin is in excess of the normal. Experiments have established that its large doses, by increasing vagus tonicity, indirectly favors heterotopic impulses, and a ventricular automatism. If we may assume sudden ventricular fibrillation as the most plausible explanation of anginal sudden death, we should beware of the risk of increasing the tendency to heterotopic impulse formation by a relative overdose of morphin.

CAN PHYSICAL STIMULI BE OF HELP IN ANGINA? This is a novel question in the treatment of a motor disablement which nature seems to meet by enforcing absolute immobility. Can we possibly improve upon her method by reversing it, and shake the disordered heart into normal rhythm? Some laryngeal, some esophageal spasms, nay, some tachycardias, are undoubtedly benefited by the spinal succession method. We tremble at the thought of any such violence applied to the heart's agony, and may wisely refrain from trying it, though wonders are greater than our dreams. In a purely molecular form, S. Tousey has attempted the physical method, and he claims for it an unhopd-for result. He publishes in the *New York Medical Journal*, May 8, 1915, his successful *treatment of a case of angina pectoris by high-frequency currents* from ultraviolet ray vacuum electrodes, and by vibration.

THE TREATMENT OF ANEMIA advocated by H. Kohn¹ is based on Askanazy's demonstration twenty years ago of the efficacy of theobromin in warding off the attacks. It is as reliable for angina as digitalis is for a rapid and weak heart action. In a pronounced attack, morphin (0.01 gm. at least, or up to 0.02) is the immediate resort, to

¹ Berl. klin. Wehnschr., May 17, 1915.

be repeated if necessary. Together with this, an injection of camphor or caffein, likewise renewable, amyl nitrite or nitroglycerin, alcohol, moist heat over the heart, and hot foot and hand bathing. The status anginosus, comparable in its continuous tendency to partial or abortive attacks with the status epilepticus, is strikingly controlled or suppressed by theobromin, which should also be administered as a prophylactic. He wisely confines the patient to bed till all heart symptoms have subsided, discourages physical exertion, and forbids tobacco.

A Postural Epigastric Sign for Pyloric or Infrapyloric Ulcer is described by H. Stern in last October's *Archives of Diagnosis*. Stretching the epigastrium seems to relieve the sufferer. When in bed he lies at full length, often on the left, never on the right side. In biliary or appendicular colic the legs are drawn up, and in gastric ulcer, too, this characteristic posture is not assumed. It is mentioned here because of its bearing upon the diagnosis of pylorospasm much more than of ulcer, the writer having had personal experience of it in the absence of any ulceration; and because pylorospasm is one of the most important questions in the urgency of our diagnosis in all attacks of an anginal type. This sign should be specially studied from the clinical aspect of the so-called "abdominal" angina.

The Tachycardial Neuroses. According to L. Gallavardin,¹ neurosis contributes a large proportion of those tachycardias which are not of the grave type identified with abnormal sporadic stimuli arising at various heart levels, but are merely accelerations of the normal sinus rhythm. Pure sinus tachycardia, in addition to its irregular productions from strain, emotions, intoxication, reflex action, and to its continuous forms under stress of organic heart disease or goitre, is observed in a variety of neurotic states which lend to it a characteristic feature of instability and of spontaneous diurnal or momentary variation. It is safe to assume an underlying irritability of the sympathetic system. The question is whether in them the thyroid is also actively involved, as it is in the clinically indistinguishable type of larval Graves's disease; or whether the sympathetic syndrome is independently induced in each of them by some separate individual neurotic provocation.

FATIGUE BRADYCARDIA. Dr. Gouget has noted the frequency of bradycardia in soldiers, wounded or sick, coming directly from the front. Out of the 133 of these men, without any fever, one third had a rate of between 58 and 38. Other men had relative bradycardia, in the course of febrile affections usually accompanied with a rapid pulse. Slight irregularity and low tension are usually combined with it. Most often these phenomena disappeared in a few days or two or three weeks. Occurring in the course of various affections, they seem to be quite independent of the nature of the latter, and are due to overfatigue.

¹ Arch. d. mal. du cœur, February, 1916.

AN ADAMS-STOKES SYNDROME OF UNUSUAL TYPE is described by W. S. Thayer¹ in a typically syncopal and eclamptic chronic bradycardia in a female patient with irregular action down to 30 per minute. The P-R time sometimes in excess of 0.7 second, and the A-C interval from 0.7 to 1 second are, he thinks, unprecedented records. In this case, a synchronous slowing of the auricles as well as the ventricles, seemed to indicate an essential interference with the sinus impulse in addition to a diseased auriculoventricular bundle. He also reports, in a man aged thirty-five, a chronic essential sinus bradycardia, down to 30 or 40 pulsations at rest, without any prolongation of the As—Vs interval. Exercise, deep breathing, and atropin are relatively effective. With the exception of initial attacks of vertigo and nausea five years ago, the patient remains in apparent health, and free from the usual effects of auriculoventricular dissociation. In the same number, "Interesting Observations on Sino-auricular Heart-block" are also contributed by A. S. Levine.

Snuff Poisoning. Since 1914, 25 cases have been traced in the Mayo Clinic to the use of "Copenhagen" snuff. Among the worst symptoms described by E. L. Crispin in the *Journal-Lancet*, 1916, are dyspepsia headache, heart irritability, dyspnea on exertion, and greatly impaired mentality as in some cases of definite psychosis under observation in the Rochester State Hospital. Moreover, in snuff-chewers, the constant local irritation might develop into malignancy. He considers that there is an urgent call for prohibitive legislation.

The Chief Dangers from Iodine Medication have long ago been identified with the presence of a preëxisting common goitre; and also with Switzerland as their chief field, because 90 per cent. of its population (exclusive of the Jura district) are estimated to be endemically more or less goitrous. A. Oswald,² of Zurich, bases his remarks upon his 11 personal cases in addition to those on record. The symptoms are those of hyperthyroidism, ranging up to the typical Graves's complex. They result, he thinks, from a mechanical flooding of the blood with the large supply of secretions stored up in the goitre. Iodin "mobilizes" them. But, in addition, it may stimulate the thyroid into greater activity, and modify its secretion into the more toxic compound known as iodiothyroglobulin. This might account for sudden attacks where previous administrations had remained innocuous.

¹ Archives Internal Medicine, January, 1916.

² Corr. Blatt. f. Schw. Aertze, May 22, 1915.

DERMATOLOGY AND SYPHILIS.

By WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY.

The Autoserum Therapy. A good deal of attention was given to this subject in last year's review,¹ more especially to the various reports and criticisms, favorable and unfavorable, that have been published by various observers. Details as to methods will be found in that and previous issues. It will suffice to detail here the results of twelve months' further experience with the method, together with such changes in technic as have been found necessary. I shall base my remarks on the results attained in private practice almost entirely, and for the following reasons: The method is too troublesome and lengthy for employment in dispensary service; it is applicable essentially for patients who are able to pay for the time and service required. And in my service at the City Hospital, where it has been largely used, it has been found that the practical impossibility of keeping track of these patients, after they have left the institution, militated greatly against the value of statistical observations on patients in the wards.

I have the records of 62 private patients treated with the autoserum up to date, as follows: psoriasis, 31; eczema, 6; pemphigus, 5; acne, 5; furunculosis, 4; chronic urticaria, 4; and folliculitis, leprosy, parapsoriasis, scleroderma, lichen planus, dysidrosis, and ulcerative radiodermatitis, 1 each. This is a comparatively small number; and it is largely due to the fact that I have not felt able to employ the method on a large scale, and for experimental purposes only. An additional reason is the fact that only in very severe, extensive, and recalcitrant cases of these various affections was it employed; for milder cases, the ordinary local and general measures sufficed. In spite of these drawbacks, my experience with the injections has been, I think, greater than that of anyone else; and I shall endeavor, as objectively and judicially as possible, to record the results that I have obtained. And here I must interject and emphasize a point that is frequently lost sight of by various observers: The autoserum treatment is in no sense, save in exceptional cases, a curative measure; appropriate local treatment is required in every case. But it is, as the experience of myself and others has shown, a most valuable and important aid in many cases; and it is

¹ PROGRESSIVE MEDICINE, 1915, p. 97.

of especial value in a large class of chronic and obstinate dermatoses that usually resist our most persistent efforts. With its aid we can get results that in many cases are otherwise unattainable.

Psoriasis, as an extremely common and intractable dermatosis, and as the one for which the autoserum treatment was first advocated, naturally forms about half of my cases. The results obtained in the treatment of this affection by the usual methods are well known. Ordinary and limited cases frequently respond fairly well to the local treatment in vogue, chrysarobin, tar preparations, mercurials, etc. It is always, however, a matter of weeks and sometimes of months before we make any decided impression on the local lesions; and meantime the patient is subjected to a troublesome and dirty ointment course, ruining bed and body linen, and not infrequently keeping him away from his duties for prolonged periods of time. Severe and extensive cases, on the other hand, are frequently partially or wholly intractable; the lesions improve, but do not disappear; and it is a not infrequent and disappointing experience to see new lesions appearing on the skin while the patient is under treatment. In fact, there is a certain proportion of the severe cases in which local treatment, even in skilled hands, leaves us entirely in the lurch. I need hardly refer to the various forms of internal treatment that are still occasionally advocated in this dermatosis. None of them, arsenic, thyroid, diet, etc., have seemed to me to have any marked effect on the psoriatic efflorescences. In a general way, it may be said that our routine treatment of this very common affection is entirely unsatisfactory and insufficient.

I am wholly convinced that the introduction of the autoserum treatment has made a great and salutary change, even if there seems to be no prospect of its effecting a permanent cure. During the preliminary serum treatment, which takes some three weeks, the patient's ordinary avocations are not interfered with; he can, in almost all cases, go on with his work immediately after the injection, though it is as well to counsel comparative quiet for the few hours immediately succeeding the operation. At once after the last injection the local treatment is commenced; and I always stipulate, before beginning the injections, that the patient places himself entirely in my hands for from three to five days, the time usually required to clear his skin. During that time he must be at a hospital, or, if he is at home, the services of a skilled nurse must be enlisted. Abundant experience has shown me that to leave the local treatment to the patient himself or to his relatives or friends is unsatisfactory. The local applications must be made under the direct supervision of the physician, and varied as occasion demands. As a rule, they consist of a prolonged hot-water bath and green-soap scrub once daily, together with the vigorous inunction of an antipsoriatic ointment twice daily. This latter is usually a chrysarobin-vaseline of 1 per cent. to 3 per cent. strength, together with 1 per cent.

of salicylic acid if there is much induration of the plaques and thickening of the skin. A vigorous reaction which is desirable may occur after the first inunction; it never fails to take place after the fourth or sixth. A soothing ointment or dusting powder is then applied, and the services of the nurse can be dispensed with.

Under these circumstances, I have never failed, in any case no matter of how long standing, or how obstinate it has proved in the past, to get a reaction and clear the skin in from two to seven days. Sometimes the effect is positively brilliant. In the very worst cases only a small, red psoriatic lesion may be left in the centre of the original patches; in that case these remnants of the original efflorescences have to be further treated until they disappear. Contrast these results with the four to six weeks of harassing and uncleanly local treatment which is the rule in extensive cases treated with local measures alone. I do not hesitate now to promise to clear any psoriatic skin in a week at the most.

And now as to the relative permanency of the therapeutic effect. That the autoserum and local treatment combined in many cases does not cure the psoriasis permanently, my experience sufficiently demonstrates. A considerable number of the patients have not reappeared; and their subsequent condition must remain a matter of doubt. But I am quite sure that in many cases the skin remains clear for periods far longer than is usually the case after treatment; in some of my cases for as long as eighteen to twenty-two months. And in only 1 or 2 cases has the relapse been a severe one, or in any way comparable to the original affection. It consisted in almost all cases of a few, two to a dozen, minute lesions; and these lesions quickly receded under local measures. In 1 case only was the result disappointing; a considerable number of small new lesions appearing a few weeks after the treatment was ended.

Reviewing then the entire subject of the autoserum treatment of psoriasis in the light of two years' additional experience, the following conclusions seem warranted:

1. The autoserum treatment does not cure psoriasis.
2. It is a very efficient aid to the local treatment, enabling us to cut down the troublesome period of local treatment from weeks to days.
3. It enables us to clear the skin in cases otherwise recalcitrant to local measures.
4. It markedly postpones relapses and lessens their severity.

In chronic urticaria and senile pruritus, the effects of the injections varied; sometimes they were remarkable. One of the former patients had an autoserum course the year before last, and returned last winter for another one. On both occasions, she had her first night's unbroken rest in a long time after the second injection, and both times she was discharged after the serum course in a perfectly comfortable condition. This patient says that she is quite willing to take a serum course every

winter for the relief that it gives her, and which she has sought in vain from half the dermatologists in the city. In a general way, I can say that the injections are in some cases remarkably effective in these maladies; in others they fail; they are certainly worthy of trial in these usually obstinate and sometimes practically incurable affections. Very much the same can be said of the chronic eczema, folliculitis, acne, and furunculosis cases.

I have treated only a single case of bad necrotic and ulcerative radio-dermatitis with the injections; but the results were so remarkably good that I do not hesitate to recommend them in similar cases. This has already been reported on.¹

In scleroderma, lichen planus, lepra, and pemphigus, no results at all were obtained from the injections. In the last disease, of which I have had 5 cases, the utter hopelessness of all suggested therapeutic measures lead me to employ them in all cases in which the skin of the arms was not so affected by the diseases that aseptic work seemed impossible; that is to say, in about half the cases that have come under my observation during the last two and a half years. In 2 of these cases the injections seemed to do the patients some good for a time, but the disease soon resumed its malignant course to its inevitably fatal termination. Nevertheless, in the complete absence of any other treatment that offers hope, I am inclined to try it again, more especially in cases seen during the earlier stages of the affection.

I have not made any essential change in the technic of the injections since the last report was made, except that I now give them at shorter intervals, say three days or so, so as to abbreviate the time of preliminary treatment, and to complete it in three weeks. Thyroid medication, which I employed in a number of the psoriasis cases in conjunction with the injections, I have abandoned entirely. I have never been able to convince myself that the drug had any real effect on the disease, and in one or two instances, even when carefully guarded with strychnin, its action on the patient's general condition was very bad indeed. In one of them it took the patient several months to recover from the persistent tachycardia, fainting spells, and other symptoms occasioned by one month's exhibition of the drug. I draw as much blood as I can obtain through one large-calibered platinum needle, up to 200 c.c. At the first injection or two, of course, I take lesser amounts, and gradually increase the autoserum dosage; and equally, of course, I do not use the larger doses in young, undersized, or anemic individuals. The blood is allowed to clot, taking fifteen to twenty-five minutes; it is then centrifuged for thirty minutes in a high-speed centrifuge, running about 5000 revolutions per minute. The serum is then decanted and recentrifuged for ten minutes. It is then immediately reinjected

¹ Journal of the American Medical Association, October 3, 1914.

into the patient, the same orifice in the vein from which the blood was drawn being used, if possible. The whole operation takes a little over one hour. I would warn against any unnecessary delay in the reinjection; sending the blood away to be prepared, or keeping the serum overnight in the ice chest is dangerous. We do not know the nature of the changes that occur in the blood serum while it is outside the body, but that some change does occur, and that the substance we reinject is not the same as that drawn is shown by the fact that in a very few cases distinct anaphylactic symptoms have occurred after the injections. With the exception of this rare occurrence, and when the injections are given in the manner laid down, the experience of a great many hundreds of them show them to be absolutely harmless and devoid of danger. I permit my patients to go about their usual business half an hour after the injections are given.



FIG. 6.—Blastomycosis of the eyelid. (Jackson's case.)

Blastomycosis of the Eyelids. Edward Jackson¹ records 2 cases of blastomycosis of the eyelids, in the first one the cheeks, neck, and nose were affected, as well as both eyelids, and the diagnosis was therefore easier. In the other case here figured (Fig. 6), the malady began with a small swelling which the patient mistook for a sty on her left upper lid. In spite of specialist treatment, the affection got progressively worse; spots appeared on the lower lid, and others on the upper. Both upper and lower lids were swollen to double their normal size, and showed three distinct ulcerations. They were covered with large, rather flabby granulations, with a moderate purulent discharge. The edges of each lesion were elevated and thickened, suggesting the margin of a rapidly

¹ Journal of the American Medical Association, July 3, 1915

extending epithelioma, but more acutely inflamed, quite soft to the touch, and containing at many points minute abscesses, 1 or 2 mm. in diameter or smaller, from which pus was readily pressed out. (This is a characteristic feature of blastomycetic ulceration G.) Smears of this pus showed a few diplococci and many budding blastomyces. Vision and eyeball were normal. The treatment was potassium iodide, 10 grains three times a day, and gradually increased; with a 4 per cent. silver nitrate solution applied to the ulcerations. In three weeks she was completely cured. The interesting point in this patient's history was the fact that she was for a long time under specialist treatment without the disease being recognized.

Complement-fixation in Parasitic Skin Diseases. Various observers have been experimenting in this field, among whom the work of Kolmer and Strickler¹ deserves mention. Even if practical results are attained, however, the value of the method in the parasitic dermatoses will be very limited. The clinical and ordinary microscopic diagnoses are almost always readily made, and the accepted modes of treatment are in general quite satisfactory. Certain features of these observers' experiences are, however, of interest.

Ringworm, even of the scalp and beard, is a superficial affection, the invasion of the fungus being usually limited to the shafts of the hairs and the neighboring cells of the hair follicles; there is no true infection, in the sense of the penetration of the epithelial barrier by the microparasite; yet in some cases the presence of antibodies may be demonstrated in the serum of a person affected with the disease. Possibly soluble products may be produced by the fungus which, on absorption, are capable of stimulating the body cells to produce antibodies. In favus, however, not only are all the layers of the epithelium invaded, but the underlying corium as well sometimes, so that the disease may be regarded as a true infection. The relations of the antigens of the fungi as regards complement-fixation of the blood in other diseases, and notably in syphilis, are important, and these have also been studied by the observers above mentioned. It is not within our province to go into the details of the technic employed; the results they attained are summarized as follows:

1. With a polyvalent antigen of *Microsporon audouini* complement-fixation was found to occur in 78 per cent. of persons suffering with ringworm of the scalp.

2. The serums of 2 cases of favus yielded positive reaction with an antigen of the *Achorion schoenleinii*.

3. The degree of reaction in both ringworm and favus was observed to depend in general: (1) on the severity of the infection, and (2) on its duration.

¹ Journal of the American Medical Association, March 6, 1915.

4. A culture of the scales of pityriasis versicolor, regarded as a doubtful culture of *Microsporon furfur*, reacted weakly or irregularly with the serums of ringworm and favus patients and negatively with the serum of a case of pityriasis versicolor.

5. The ringworm and favus antibodies (amboceptors) fixed complement best with their respective antigens, but with relatively large quantities of serum this specificity was not observed, owing, probably, to a biological relationship of *Microsporon audouinii* and *Achorion schoenleinii*.

6. The antigens of the fungi did not fix complement with the serum of syphilitics or with that of persons suffering from scabies, impetigo contagiosa, eczema, acne, and other diseases.

Diphtheria of the Skin. Diphtheria of the skin is rare, so that the subject has never yet been considered in these pages. Yet every dermatologist sees an occasional case, and the fact that it occurs almost always in cases of mucous membrane diphtheritic infection, which is common, makes it of interest to the general practitioner. Knowles and Frescoln,¹ on the basis of 2 personally observed cases, give a good resumé of our knowledge of the subject.

Diphtheria of the skin was first recognized by Chomel in 1759, and Bard recorded an epidemic of the disease in New York in 1771; but, though Trousseau wrote extensively about cutaneous diphtheria in 1830, it was 1891 before Neisser established the identity of the affection by the demonstration of the Klebs-Löffler bacillus in the lesion. The rarity of the disease is shown by the fact that at St. Anne's Children's Hospital of Vienna from 1894 to 1902, out of 2217 cases of clinical and bacteriological diphtheria the skin was attacked in but 23 cases, and most of these were of the false membranous type. Mallory found that in a series of 251 cases of diphtheria the skin was attacked but once.

The skin lesions recorded from diphtheritic infection have been of the most varied types; the commonest is that of the false membrane; but instances of ulcerative, gangrenous, eczematous, impetiginous, ecthymatous, varicellar, carbuncular, and other lesions have been noted; even tumor and abscess formation has been seen. Knowles and Frescoln's 2 cases were of the bullous impetigo type, and 1 of them terminated fatally. The variability of the lesions might render the diagnosis a matter of considerable difficulty were it not for the fact that mucosal diphtheria is always present, and antecedent either in the affected individual or in some one around him. Inoculation of the skin occurs by auto-inoculation, by means of infected articles, and from one person to another. It may occur primarily on the integument, remain limited to it, spread to the mucous membranes, or, more commonly, is secondary to throat, nasal, or laryngeal diphtheria. Either the true

¹ Journal of the American Medical Association, August 1, 1914.

diphtheria bacillus of Klebs-Löffler or the pseudodiphtheria bacillus of Hoffman may be found. These diphtheritic skin lesions are a constant source of contagion, since they are frequently unrecognized for a considerable period. They may last for a long time or run a rapidly fatal course.

Eczema and its Theories. In the 1913 issue of this review¹ some account was given of the more recent researches into the etiology of this commonest of dermatoses, more especially in its relationship to the pus infections that cause phenomena in many cases undistinguishable from it. The results of the painstaking investigations that I reviewed were so meager that I had to confess that, as regards the etiology of eczema, we were as much in the dark as ever. Treatment remains, therefore, as empiric and as unsatisfactory as before; nevertheless, some work of importance has been done during the past two years.

White² has studied the anaphylactic phenomena in eczema, and, as the result of his researches, has come to some conclusions as to the etiology and treatment of the disease. In his preliminary report, he makes the following deductions on the question of food in its relation to chronic eczema at various ages of life:

1. Eczematous infants usually present in their stools an excess of fat or starch. An excess of fat generally means a moist eczema; an excess of starch usually means an eczema of a dry type.

2. When eczema is present, and neither fat nor starch appears in excessive amounts in the feces, the physician should look for susceptibility to egg albumen or to milk, or, in default of all these more common causes, to a diminished thyroid secretion.

3. Susceptibility to egg or to milk can be demonstrated by the new method of food inoculations, a procedure analogous to the von Pirquet test for tuberculosis and the Schick test for diphtheria.

4. This cutaneous method can be extended to the study of the action of other food elements in eczematous individuals.

5. Normal individuals, so far as White has ascertained, do not react to these tests.

6. In chronic eczema the great majority of its victims seem to exhibit anaphylactic reactions to one or more types of food substances.

7. These same anaphylactic phenomena, as evinced in the few instances investigated, seem to be present in other diseases which have been associated in the past with food disturbances, notably urticaria and probably acne.

8. Approximately 20 per cent. of eczematous individuals do not appear sensitized to any of the common food types. These exceptions may

¹ PROGRESSIVE MEDICINE, September 1913, p. 110.

² Journal of Cutaneous Diseases, February, 1916.

denote that all cases of eczema are not due to abnormal food sensitization, or that special articles of food, not tested in the experiments, may be the causative factors. Such exceptions have been demonstrated by pediatricists, as for example, the well-known case in which English walnuts produced asthma in a child.

9. In practically 30 per cent. of these cases, one or more of the controls proved positive. This sign may be considered analogous to the symptoms usually observed in urticaria, *i. e.*, dermatographism.

10. In the few cases in which both stool examination and cutaneous tests were made there was one contradictory finding. Fat was excessive in the stool and negative on the skin, while starch was present in the feces and negative cutaneously.

11. One cannot apparently tell, from the type of eczema present, what food elements will give positive food reactions.

The subject is an interesting and important one, though for details as to methods the reader must consult the original article. We entirely agree with White that further investigations are required on the subject of the relationship of food-poisoning to chronic eczema. Bulkley, as is well known, has been for many years an advocate of the theory, though his opinions have been based rather on clinical results than on scientific investigation. The pediatricists very generally assume the relationship and treat their cases of infantile eczema on that basis. Thus, Freeman,¹ in a paper read before the State Medical Society of New York, assumes that excessive feeding or, more rarely, a badly balanced diet is the real cause of the disease. He apparently cures his cases chiefly by regulating the diet, but I note that he also employs a careful and efficient system of local medication. I have myself long noticed the connection between errors of diet and exacerbations of the eczematous disease; and though, from ignorance of the subject, I have never attempted a scientific regulation of the diet in cases of infantile eczema, I always cut down the feeding if it seems excessive, and prohibit such habits as allowing the infant to sleep at the breast or feed too rapidly. In almost all cases these simple measures, together with an appropriate mask and ointment treatment, have sufficed; and where it did not do so, I have called in the assistance of a pediatrician to regulate the diet.

Medalia,² on the other hand, makes an argument for the bacterial nature of eczema and treats it with vaccines. Yet he admits its non-bacterial nature in the beginning and calls it a dermatitis, holding that it only becomes a true eczema after secondary bacterial invasion has occurred, and he also emphasizes the importance of remedying food idiosyncrasies, occupational noxæ, etc. His results, which are based on

¹ Archives of Pediatrics, October, 1914.

² Boston Medical and Surgical Journal, August 5, 1915.

the study of 51 cases, with 43 cures, and an average duration of eleven weeks, do not seem especially good; we certainly do as well with ordinary local measures which, by the bye, Medalia by no means despises. He blames the *Staphylococcus aureus* as the chief cause of the affection, and recommends an autogenous vaccine in its treatment. His conclusions are of interest, and are as follows:

1. Eczema is really primarily a dermatitis caused by an external or internal irritant.

2. A secondary bacterial invasion is necessary for it to become a true eczema; this is always the *Staphylococcus aureus*, occasionally aided by the *albus* and the *streptococcus*.

3. The general condition, food idiosyncrasies, habits, and other exciting causes of the dermatitis must be looked into and, if necessary, corrected; and local treatment, though only temporary in its effect, is a necessary adjunct to the vaccine treatment.

4. An autogenous vaccine in large doses, 7,000,000,000 organisms or over, is necessary for the successful treatment of the disease. It gives the best results by far of any treatment recommended.

Medalia's conclusions are open to criticism on many points. The bacterial origin of eczema has been abundantly studied, and the general conclusion has been negative, though, of course, any eczema may and most usually does become secondarily infected. The dermatologist, at all events, cannot in many cases distinguish a beginning eczema from a beginning dermatitis; in point of fact there is no real difference between them. Finally, the careful attention that he pays to underlying food or habit or occupation causes, and the careful local treatment that he employs, robs his conclusions as to the value of vaccine treatment of much of their cogency. His therapeutic results are apparently no better than those gotten without the vaccines.

Heliotherapy. Under this general title, I propose to consider not only the newer dermatotherapeutic methods, such as the various forms of mercury vapor lamps, but also some articles of importance in the field of radiotherapy and radium treatment, which may be grouped under the same heading. Among the many treatises that have appeared, that of Jesionek¹ is important. He presents evidence to show that the main factor in the therapeutic action of the light rays is the pigment formed in the epidermis under their influence; not the pigment inside the cells, but the excess of pigment granules formed and thrown off by the cells. The way in which the tanned skin tends to recover its whiteness when it is no longer exposed to sunlight, natural or artificial, testifies to the rapidity of absorption of the pigment. This absorbed pigment undoubtedly, he says, has more or less influence on the physiological and pathological processes of the body. He finds this a possible

¹ *Zeitschrift f. Tuberculose*, November, 1915, and December, 1915.

reason for the prevalence of tuberculosis in negroes when removed from their natural environment and light exposure; and he adduces the fact that blondes, whose skin does not generate pigment as readily as that of brunettes, and who are known to be more commonly affected with this disease than others, as further evidence of his contention that it is to the melanotic pigment of the epidermis that the effects of heliotherapy are due. As chief of the Lupus Sanatorium at Giessen and of the University Clinic for Skin Diseases, he has had abundant opportunity to test heliotherapy in tuberculous affections of the skin. In extensive cases, the entire body is exposed to the sunlight or to the mercury vapor lamp, and he is convinced that the pigment generated by the rays is absorbed into the circulation and exercises a therapeutic influence on the tuberculous foci. Lupus foci shielded against the light healed under general heliotherapy, which can be explained only under the above assumption. He gives an illustration of 15 lupus patients, some of whom have been taking this treatment for several months, and their skin shows as dark as a negro's in the photograph. The sunbath room used for the purpose has glass walls, and the patients in bathing trunks are gradually accustomed to the light, only fifteen to thirty minutes' exposures being given at first, and care being taken to avoid sunburn. By using several mercury vapor lamps at one time, sunlight can be dispensed with, the pigmentation by this method being quite equal to that from sunlight. Thus, the treatment can be conducted in winter and in places where direct sunlight is unattainable.

Stumpke¹ has used both the Kromayer lamp and the open mercury vapor lamp known as the artificial mountain sun, in new fields, and with promising results. The itching in refractory prurigo and pruritus was materially reduced by repeated exposures to the quartz lamp, and clinical improvement was manifest in other ways. Cases rebellious to arsenic, the Röntgen rays, and other measures, yield surprisingly to heliotherapy. He had the same experience with neurodermatitis, and in a number of cases of subacute and chronic eczema on a constitutional and seborrhoeic basis. In the latter group, the ultraviolet rays seem to modify the tissues in some way which permits the ordinary measures to become effective. He uses the sun lamp at a distance of 50 cm. for ten to twenty minutes. Towle used heliotherapy in a series of cases of skin disease, and found that graded exposure of the body to the rays promotes general bodily vigor; discourages the growth of bacteria; decongests inflamed areas; encourages the resorption of pathological exudates and of scar tissue; stimulates epidermidization, cellular multiplication, and reconstruction; and, above all, tends to relieve pain. Several varieties of pus-forming affections were treated by heliotherapy, invariably with positive results.

¹ Münchener medizinische Wochenschrift, November 22, 1915.

Lain¹ discusses the entire subject of radiant energy in the treatment of diseases of the skin. The reactions following the application of high-frequency effluvia (the violet-colored light with its shower of sparks produced by the passing of a high tension current through a glass vacuum electrode), those from fulguration (the hot spark of the same current when allowed to leap from a pointed electrode), and of diathermy (the intense heat in the tissues produced by a double or bipolar high-tension current) are similar in their nature, in his opinion, to those obtained from radium and the Röntgen ray, and are as follows:

1. When one of these agents is applied directly or in near contact to the skin for a period, there occurs a stimulation of the sympathetic nerves, a pouring out of the blood plasma, and increased oxidation and metabolism.

2. When a greater degree or longer period of application has been given, we note an increase of each of the above changes, with the additional increase of the hyperemia, elevation of temperature, and a beginning of cell degeneration, with slight exfoliation of the superficial layers of the skin.

3. If the application is continued longer or in a still more intense degree, there is exaggeration of all the symptoms mentioned under 2, with the beginning of an inflammation of the lining membranes of both the blood and lymph channels, producing an obliterating endarteritis and lymph block throughout the area receiving the direct rays. This may be of such degree as to cause complete death and slough of the tissues. Radium and the Röntgen ray are more liable to occasion this extreme reaction than the other forms of radiant energy.

Coming down to the practical application of these agents to dermatoses, Lain's conclusions may be summarized as follows: He has found the Röntgen ray very useful and almost indispensable in hyperidrosis, dysidrosis, and many forms of eczema as well as in pruritus and true prurigo. He is still an advocate of its employment in acne and rosacea, though he admits that many dermatologists reject the method as unsatisfactory and dangerous. He also advises its employment in erysipelas, claiming that a very few applications lead to abatement of all symptoms and rapid recovery. In sarcoma he has not found Röntgen therapy successful, but in epithelioma of various forms he makes the usual indefinite claims of many successful cases treated by this method. In another article² the same author takes a somewhat more conservative standpoint, concluding as follows:

(a) All cases of malignant new growths cannot be treated by one method.

¹ Journal of Cutaneous Diseases, December, 1915.

² Southwest Journal of Medicine and Surgery, 1915.

(b) All methods have been abused by employment in non-discriminating and unqualified hands.

(c) Caustics have value, and have many cures to their record when used intelligently.

(d) Radium and diathermy, etc., though still in their formative stage, have been likewise abused.

(e) For certain cases of malignant new growth, and with proper technic, the Röntgen ray is the most satisfactory therapeutic method we possess.

With all of which I entirely agree. Rost,¹ after much experimentation, concludes that by means of the various forms of artificial light embraced under the general designation of heliotherapy, lupus, and other tuberculous diseases of the skin and mucous membranes can be greatly benefited. He considers the quartz lamp as the most efficacious form. It is painless and less expensive than the Finsen treatment. Lupus of the mucosæ and the surgical forms of tuberculosis are best treated by the combination of the artificial sunlight and filtered Röntgen rays.

The treatment of rhinoscleroma with radium is the subject of a short monograph by Gutman.² Fittig³ was the first to use the Röntgen ray in this affection, and later Kahler⁴ reported cases successfully treated with radium. This subject has not been reverted to in this review for a long time, largely on account of the rarity of the affection in this country; Mayer,⁵ up to 1908, could find but 16 cases reported in North America. The experience of those who have had charge of these cases is to the effect that Röntgen-ray treatment or radium offers the only hope of even ameliorating the condition; cures have not been reported. I agree with this entirely; of the 2 cases I have had the opportunity of studying, 1 was in a very old woman in whom the final atrophic changes had set in, and whose general condition was such that energetic treatment was not considered advisable. The other occurred in the person of a woman, aged forty-five years, in whom the slowly advancing stenotic changes in the nose, mouth, and rhinopharynx caused great distress. The only measure that gave her any relief at all was vigorous radiotherapy. I have since heard that she has been in the hands of various rhinologists and dermatologists here, had had various forms of heliotherapeutic treatment with little result, and has lately died of a pulmonary complication. Both cases were described and pictured in this review seven years ago.⁶

In an elaborate article with many illustrations, MacKee⁷ recounts his

¹ Deutsche medizinische Wochenschrift, September 23, 1915.

² New York Medical Journal, October 2, 1915.

³ Beiträge zur klinische Chirurgie, 39.

⁴ Wiener klinische Wochenschrift, 1905, p. 839.

⁵ Laryngoscope, December, 1908.

⁶ PROGRESSIVE MEDICINE, September, 1909, p. 135.

⁷ Journal of the American Medical Association, November 27, 1915.

experiences with the intensive method of Röntgen-ray treatment in many varied dermatoses. His results are, in many cases, striking, and some of his "before and after" pictures in obstinate dermatoses are certainly remarkable. Yet, when doctors disagree, who shall decide? On the one hand, we have some of the oldest and most experienced röntgenologists practically repudiating the ray as a therapeutic measure, and on the other hand, skilled observers claiming to employ it successfully in a great variety of dermatological conditions. Probably the truth will ultimately be found to rest midway between these two extremes. Not all the claims made by enthusiasts in the method will stand the test of time, nor will the röntgenotherapeutic nihilism prevalent in many quarters, and of which I myself have been guilty, be finally accepted.

MacKee uses the intensive or massive dose method, preferring it almost invariably to that by divided doses. The quality of the ray used is ascertained by direct measurement (Benoist, Walter, or Wehnelt instruments), and it is maintained by means of indirect measurement (milliamperemeter, spark gap). The quantity of the ray used is measured directly by radiometers, such as those of Holtzknecht and Corbett. Enough rays may be employed in the intensive treatment to produce a second degree dermatitis, a simple erythema, a loss of hair without erythema, or less. MacKee advocates a hard ray (B8 to 10) for routine work, seldom using one of lower penetration; he admits that this procedure is opposed to that in general use. True idiosyncrasy to the ray he finds so rare that he has not encountered it in thousands of radiations. Hypersusceptibility, on the other hand, is very common. (Personally, I fail to find any difference between the two expressions.) Some parts of the body are more sensitive than others; aged individuals' skins tolerate larger doses than do those of children. Chemicals, iodine, tar, mercury, chrysarobin, salicylic acid, etc., markedly enhance the action of the ray. The skin of individuals suffering from certain diseases, mycosis fungoides, goitre, eczema, and psoriasis, may be hypersensitive. The dose required in the intensive method will vary in amount according to the disease treated and the effect desired. In epithelioma, it will be in the neighborhood of 8 or 10 Holtzknecht units; in keloid, from 4 to 6 units; in ringworm of the scalp, 4 to 5 units; in eczema and psoriasis, 2 to 3 units, etc.

Treated by this method, MacKee describes and figures a great variety of dermatoses, a mere list of which is all that can be given here. It includes granuloma annulare, lichen planus, chronic eczema, erythema induratum, prurigo, psoriasis, hyperidrosis, warts plantar and palmar, juvenile and other, lichenification, lichen circumscriptus, dysidrosis, clavus, callositas, keloid, acne keloid, lupus vulgaris, tuberculosis verrucosa cutis, nevus vasculosus, rhinoscleroma, tuberculosis cutis, epithelioma, tuberculous adenitis, lupus erythematosus, Paget's disease, senile keratoses, sarcoma cutis, mycosis fungoides, leukemia cutis,

lepra, ringworm of the scalp, pruritus, onychia hypertrichosis, cheilitis glandularis, sycosis vulgaris, seborrhoea, comedo, acne vulgaris, rosacea, onychomycosis, actinomycosis, blastomycosis, and leukoplakia. Truly, a formidable list, and one which, if substantiated, would go very far to render all other methods of dermatotherapeusis superfluous. In justice to the author, however, it must be stated in some of these affections he admits partial, inconclusive, or negative results; but in most of them complete cure or amelioration was obtained with the Röntgen ray alone.

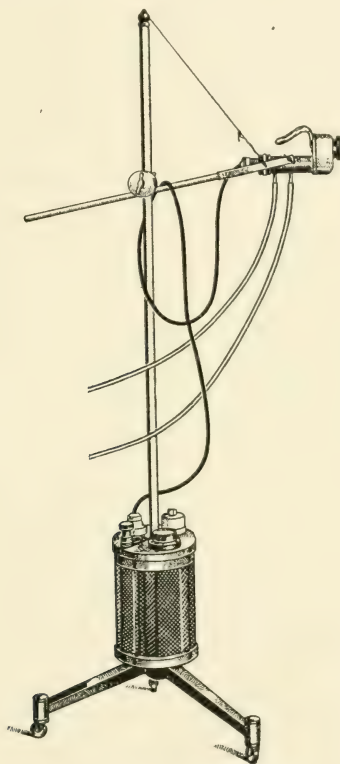


FIG. 7.—The Kromayer lamp.

In this connection, a few words may be said about heliotherapy in its more restricted sense, and the apparatus employed in its application. That distinct local therapeutic effects can be obtained from the employment of the chemical rays at the violet end of the spectrum is undoubted; the Finsen lamp, the Kromayer, and other quartz lamps, the various mercury vapor arcs, are fairly well established dermatotherapeutic agents. But a word of warning is necessary. Heliotherapy, of course, has been exploited commercially, and all kinds of lamps with colored bulbs and reflectors are vaunted as efficient heliotherapeutic agents. As a matter of fact, the chemical rays emanating from an ordinary glass

bulb, no matter what the size, candle power, or color, are so small in amount as to be negligible therapeutically; the only action of these lamps is due to their warmth, and they are valueless for heliotherapeusis. The mercury vapor lamp in quartz bulbs is the only practical apparatus that we have for the production of ultraviolet rays in amounts comparable to those in the sunlight of the mountain tops. Two forms of apparatus are now available here which are efficient and satisfactory; unfortunately, they have been given popular, and to my mind, inappropriate names. The first is a mercury vapor lamp of rather large size, air-cooled so that water-jacketing is unnecessary, and with a rock crystal container that not only gives free passage of the ultraviolet rays of the spectrum, but permits of greater heating by the current, and hence of a larger volume of the effective rays. The second is a smaller, but intenser, mercury vapor arc in a similar container, but water-jacketed and requiring a constant flow for its safe and effective operation; with it come several rock crystal lenses of varying size and shape for close application of the rays to various local lesions. Unfortunately, neither apparatus, and especially the latter one, is simple or inexpensive, but both are efficient means of obtaining the ultraviolet rays for therapeutic application. I have made quite extensive use of the first apparatus, especially during the last year, in chronic dermatitis with ulceration, alopecia areata, alopecia seborrheica, acne, rosacea, and obstinate localized patches of chronic eczema and psoriasis, etc., and I am satisfied that they are the most practical means at our disposal for obtaining the therapeutic effects of the ultraviolet rays.

Itching. From the patient's point of view, no symptom is of greater importance than the pruritus that accompanies many dermatoses and is the chief phenomenon of some of them. The physician knows that in most cases it is comparatively unimportant, and that not infrequently it persists for a time after all other disease symptoms have disappeared. In occasional cases, and in certain diseases, however, such as pruritus senilis, prurigo, lichen planus, mycosis fungoides, etc., it is severe enough to seriously disturb the patient's general health; and I have seen a case of mycosis in its early stages in which the patient was brought to death's door by the almost absolute insomnia for prolonged periods of time than it occasioned.

Unna¹ has made a careful study of the cause and treatment of itching. His elaborate article is apparently published in five instalments, three of which, owing to the disturbed conditions abroad, have not reached me; but the subject is important enough to warrant a review of the material at hand. Recent research has, to a large extent, explained the mechanism of itching; it is in all cases due to irritation of the free nerve terminations in the papillary layer of the skin. Cocain and

¹ Berliner klinische Wochenschrift, November 29, 1915 *et seq.*

epinephrin relieve itching as well as pain, but leave touch sensation unimpaired; saponin, on the other hand, banishes touch sensation, but does not modify pain or itching. For itching to occur, there must be skin papillæ containing nerve terminations, and an intact corneous layer over them, pressure on the papillæ being necessary for induction of the sensation of itching. Hence granulating and ulcerated surfaces do not itch, but they heal over and epidermis or scar tissue forms, the horny layers presses on the granulations and itching occurs. Finally, the pressure on the vessels and the terminal nerve filaments and the resistance of the epidermis reaches a balance and the itching stops. If a blister forms, itching ceases, owing to relief of the capillary tension. Increased pressure of the horny layer, together with increased capillary tension, explains the itching in chronic eczema, lichen and prurigo papules, incipient furuncles and folliculitides. Scratching, especially when carried to the extent of rupturing the epidermis and permitting serum or blood exudation, thus relieves itching in two ways: it lessens the external pressure and relieves the internal tension. Epinephrin, cocain, electricity, or venesection relieve itching by lessening the internal tension alone. Driving the blood out of the capillaries by collodion, elastic stockings, binders, plasters, or bandages, relieve itching in the same way. On the other hand, the gravity hyperemia, with increased capillary pressure induced when the pressure of the clothing is removed, explains the pruritus that occurs in patients with varicose veins after undressing.

That the internal vascular pressure is an important element in the production of itching is shown by the fact that anemic surfaces do not itch, but when the Esmarch bandage, for instance, is removed, itching is liable to occur, as it does after the skin has been chilled. The cold contracts the vessels and the veins yield to it more readily than the arteries on account of the higher pressure in the latter. The blood stream is slowed and an actual stasis hyperemia of the affected region occurs. As the region warms up, the capillaries again become distended and press against the horny layer, irritating the terminal nerve filaments; thus, the face and hands may itch on entering a warm room or settling in bed. Warmth alone will not induce itching unless there is previously a stasis hyperemia. Cold compresses will relieve the itching that accompanies the hot flushes of the menopause; they reduce the supply of blood to the paralyzed musculature of the arterioles. Cold applications, however, increase the itching after frost bite, for they cause the musculature of the skin to contract, and thus increase the epidermic resistance to the capillary pressure below. When the corneous layer is thickened by disease, as in lichen and prurigo, and when in addition the arterial walls become paralyzed, so that there is an excessive inflow of blood, or when there is inflammatory exudation, the severest itching that we meet with is experienced.

The chief therapeutic suggestion contained in that part of the article that is before us, is the employment of monochlorbenzol, which Unna claims to be a very effective and non-toxic means to relieve the conditions that cause itching. He uses it in a 1, 2, or 5 per cent. alcoholic solution, adding 2 per cent. of castor oil if the skin is very dry.

Favus and Ringworm. Lane¹ calls attention to the difficulties encountered by the general practitioner in the treatment of these affections, of course, only when situated, as they most frequently are, upon the scalp. Ringworm of the non-hairy parts is readily cured by the use of green soap and hot water, together with any parasiticide application, and the very rare cases of favus of the body surface are still more readily dealt with. These difficulties are due to the multiplicity of the treatments proposed, the confusion in the diagnosis of the different varieties, the uncertainty, in most cases, of an ultimate spontaneous cure, the depth of the anatomic seat of the lesion in a certain number of the cases, and the difficulties of the diagnosis of a cure. The obstinacy of some of these infections is not to be wondered at when we consider the tenacity of life exhibited by some of these fungi even when removed from the scalp. Ringworm can ordinarily be produced from crusts that have been preserved for from three to six months, and instances of successful inoculation have been known to take place after eighteen months, though the spores are always dead after two years. In the hair, the life of the fungus is longer, and spores in removed hairs will usually grow after fifteen to eighteen months. Favus spores have been found living in the scutellæ after two years. Many of the fungi are buried deeply in the hair follicles and in the interior of the hairs. In view of these facts, and the additional circumstance that in the case of ordinary ringworm, for instance, soaking the hair in absolute alcohol for as long as twelve hours will not inhibit the growth of the fungus, we are not surprised at the inefficacy of chemical agents as ordinarily applied. This statement may be extended to include the Röntgen ray as commonly used, since it is not a parasiticide. Only epilation, either mechanical or by means of the Röntgen ray, enables the parasiticide agent to reach the offending organism. Saboureaud,² the chief authority of these affections, says plainly that the frequent observations of favus cured without depilation by various applications must assuredly be ranked as fables; and that when an author claims to have cured a tinea tonsurans in three weeks, he evidently does not know what he is talking about, since it takes at least six weeks before any affirmation as to cure can be made.

In view of the fact that an accurate differential diagnosis between the varieties of ringworm of the scalp, and even in cases between favus

¹ Journal of the American Medical Association, November 17, 1915.

² Lesteignes, Paris, 1910.

and ringworm of the scalp in their chronic forms, cannot be made by the practitioner, Lane recommends the following general plan of treatment in these obstinate cases:

1. The hair is to be cut short over the whole head, but not shaved, as this prevents depilation. Even in very limited and localized cases, this should be done in the interests of cleanliness, to prevent spread of the disease, to facilitate the discovery of new patches, and to help the treatment.

2. Crusts are to be removed by oil soaking, and the head is then thoroughly washed with an antiseptic soap. Lane recommends the following: betanaphthol, 3 parts; precipitated sulphur, 10 parts; soft soap to 100 parts.

3. Thorough depilation is the most important, though the most difficult and tedious part of the treatment. Experts may use the Röntgen ray for this purpose, but the process requires special technical knowledge, and is not by any means devoid of danger; extensive ulceration, lasting for years, and great cicatricial deformity has resulted from its employment. Epilation with the forceps is the only method to be generally recommended; every patch must be cleared of hair, and kept clear, together with at least a half inch area around the margins.

4. Antiseptic applications destroy the superficial fungi, prevent spread of the disease, and after the hairs are removed, have a chance to reach the deeper-seated fungi. (They also do good by the reactive inflammation they excite; the use of croton oil, to excite an active suppurative inflammation in a ringworm of the scalp is an old and effective, but unnecessarily severe and deforming, remedy for ringworm.) The spots are to be painted daily with tincture of iodine, 1 part; alcohol, 4 parts, and the following ointment is applied to the whole head:

R—Hydrargyri precipitati flavæ	1 part
Sulphuris precipitati	1 "
Resoreinolis	1 "
Olei cadini	10 parts
Adipis lanæ	10 "
Petrolati	19 "

5. Crust removing and head washing should be done daily with the solutions recommended.

The *vaccine treatment* for favus and ringworm of the scalp has been extensively employed by Lavinder¹ and by Strickler.² The former author devotes his article to the method of preparing the vaccine and of using it; these details are not suited for mention here and the reader is referred to Lavinder's paper for them. He concludes his article,

¹ Journal of the American Medical Association, March 25, 1916.

² Ibid., July 17, 1915.

however, with the following statement: "Our therapeutic experience has been too limited as yet for us to judge results. But, up to date, our results have certainly not been brilliant." Strickler, on the other hand, has treated 20 cases at the Philadelphia General Hospital affected with ringworm of the scalp of varying degrees of severity, with the following results: cured, 14; markedly improved and still under treatment, 1; improved and still under treatment, 1; improved but left before conclusion of treatment, 1; died from measles with intercurrent



FIG. 8.—Familial favus. (Lane's cases.)

pneumonia, 1. There was practically no local treatment and the observer concludes that, from his experience of over a year, ringworm is curable by vaccines beyond peradventure of a doubt. It takes a long time, it is true, and it is troublesome, but it is as efficacious as the Röntgen-ray treatment, does not require expensive apparatus, and is free from danger.

MacKee and Remer¹ make an elaborate plea for the Röntgen-ray

¹ Medical Record, August 7, 1915.

treatment of ringworm of the scalp. They admit that it is not entirely devoid of danger, though in experienced hands accidents are very rare. The bibliography appended to the article will be found useful by those desiring further knowledge on the subject.

The status of the vaccine treatment is still *sub judice*, but most of the evidence so far before us is not in its favor; it has had a few favorable reports and more adverse ones. As with the vaccine treatment in general, the more enthusiastic users seem to be the only ones who get good results. The Röntgen ray for the epilation of ringworm and favus cases is distinctly a treatment that should be used only, if at all, by experts. In general practice, epilation by hand is the only method to be recommended, and in conjunction with that the procedure advocated by Lane is as good as any that we can employ.

In connection with this review, the accompanying photograph of 4 cases of favus in one family, published by Lane, will be of interest. In spite of the small size of the picture, the characteristic cupped crusts can be plainly seen (Fig. 8).

The Leprosy of the Bible. Old ideas die hard, especially those acquired in childhood or gotten by heredity. The average layman and, strange to say, even some doctors have ideas about leprosy that are a curious compound of vague reminiscences of Biblical stories heard in younger years and an inbred fear and horror of the disease that is many generations old. Leprosy is in some way related to moral turpitude; it is the most dreadful disease infliction that can possibly occur; the leper is doomed, and the merest contact with him may transmit the disease. Of course, we know that this is largely nonsense. Not that leprosy is not a most serious infection, with a termination that is always fatal, or that we have anything in the way of a remedy for the disease. But its early stages are often inordinately prolonged, lasting sometimes for many years; and during most of this time the patient may be, and usually is, quite capable of pursuing his usual avocations. So much is this the case that a large proportion of lepers die of something else and not of their leprosy. And during this whole preliminary period the danger of contagion to others is so small as to be practically negligible. It is probable that the presence of a nasal discharge containing the bacilli is the most dangerous condition as regards other people, and cases showing this symptom should have especial care. I have elsewhere called attention to the fact that during the thirty-five years that I have known the skin wards of the City Hospital here, we have always had from one to three lepers there; they have their own separate utensils, as the syphilitics have, but otherwise they mingle unrestrictedly with the other patients in the ward and hospital; and we have never had any occasion to regret our policy.

With regard to the malady, or group of maladies and abnormalities called leprosy in the authorized version of the Scriptures, it must be

remembered that the meaning of the Hebrew word *Zaraath* rests on an imperfect and confused tradition, and when the authors of the Septuagint translated it into the Greek word *lepra*, they acted on the best information obtainable at the time. Yet the conditions described in various Biblical passages by no means coincides with the malady we call leprosy today. Without going into details out of place here, an affection with dermal lesions "white as snow," an affection that is curable at times by baths, and a condition that is seen on clothes and houses, is not our leprosy, or at least is not our leprosy alone. Additional confusion is created by the fact that what the Greek translators of the Bible called *lepra* was rather *lepra grecorum*, or elephantiasis, than *lepra arabum*, the true disease. It is impossible, even with the results of modern research at our disposal, to determine now just what affection or affections the ancient writers included under the designation of *Zaraath*, but the chances are that leukoderma or vitiligo, psoriasis, possibly syphilis, and other affections with dermal manifestations were included in the designation as well as some lichenoid or fungoid growth that appeared on inanimate objects. In this connection it is interesting to note that in South America, where true leprosy is not uncommon, and where, as might be expected from the large admixture of negro blood in the population, vitiligo is very frequent, all cases of the latter are popularly regarded as *lepra*, and are classed with the systemic disease.

Dubreuilh and Barges¹ have recently thoroughly reviewed the subject of Biblical leprosy, and conclude as follows:

In the primitive translation of the Old Testament the word *Zaraath* is employed to designate, among other things, a group of contagious, cutaneous affections the precise nature of which is at present indeterminate, and the prescriptions of the Levitic original are medical and hygienic in their significance. Later, the word *Zaraath*, or *lepra*, was used in a more or less figurative sense, so as to include moral faults. This transformation is apparent already in the later revision of Leviticus, and is completed in the Talmud. The confusion of the Biblical term with our present *lepra* is due to an error of Constantinus Africanus, who employed the word "*lepra*" to designate elephantiasis; Hippocrates and the translators of the Septuagint using it for an entirely different affection. As a result of this confusion, the Middle Ages believed in the extreme contagiousness of leprosy and adopted the rigorous measures of isolation that led to its almost complete disappearance from Europe. It is also the reason why leprosy today inspires greater terror in the laity than do tuberculosis and syphilis, affections much more serious to the individual and much more dangerous to his surroundings.

¹ *Annales de dermatologie et de syphiligraphie*, December, 1915.

Pellagra. Two years ago,¹ I called attention to the divergence of views in medical circles concerning this affection, and though much has been written on the subject since then, little progress has been made. My personal experience with the disease, or rather with cases said to be instances of the disease, has been unsatisfactory. I was glad, therefore, when I was informed that there were 3 cases of pellagra at the Manhattan State Hospital, with which I am connected in the capacity of consultant, early last fall, and I spent an entire afternoon in hunting up these cases in the widely scattered buildings of the institution, and studying them. Unfortunately, no one of the 3 showed any dermal lesions or any traces or remains of them. They were all 3 mental cases, of course, and were in the hospital for affections other than their supposed pellagra. But I failed entirely to find any symptoms that were definite, or that were not distinctly psychiatric; I was told that they had had dermal lesions in the past, and with that I had to be content.

Unfortunately, the skin symptoms of pellagra have usually been studied and described by non-dermatologists, and the cases that I have seen personally or studied in pictures and descriptions, have not to me been distinguishable from the not uncommon affection known as acrodermatitis atrophicans either in location or in physical appearance. Swanson² says they consist of congestion, thickening, and pigmentation, and atrophic thinning, and he then proceeds to discuss their differentiation from a number of affections including such very dissimilar ones as erythema multiforme, lupus disseminatus, and syphilis. What it would be especially desirable to know would be the features that distinguish the affection, so far as the skin lesions go, from symmetrical cutaneous atrophy, called also atrophica cutis propria or akrodermatitis, which has been looked upon as a cutaneous affection pure and simple, and has not been associated with constitutional symptoms.

Almost all the other discussion has been devoted to the etiology of the disease, and here opinion seems to be as varied as it was two years ago. Dudgeon³ believes that pellagra is a multiple neuritis, which may be due to an alkaloid administered in minute doses, possibly by the seeds of the maize plant from the leaves, and that it is accidental, and due to maize faultily stored; it is evidently not found in normal maize seeds nor does he think all kinds of maize leaves contain it. Rice,⁴ on the basis of 200 cases in orphanages studied by him, discredits the corn or maize theory, but he does not advance any other with confidence, except to state that he believes that there is some relationship between the amounts of animal food consumed and the spread of pellagra in

¹ PROGRESSIVE MEDICINE, September, 1914, p. 134.

² Journal of the American Medical Association, December 18, 1915.

³ Ibid.

⁴ Ibid.

orphanages. Rondini¹ holds that a too one-sided diet is the predisposing cause for the disease. And so the matter of etiology of the affection remains about as uncertain as it was before.

A suggestion as to the treatment of the affection has been given by Booth.² He treated 16 patients in 1914, and 30 in 1915, with cacodylate of sodium, with only 1 death. He gives adults an injection deep in the muscular tissues, about 7 grains once a week, children in proportion. He thinks that if diet alone were the cause of the disease, these patients would not have recovered so easily, and further, that the disease is caused by a mildly infectious organism.

Precancerous Dermatoses. The practical importance of this subject can hardly be overestimated. Cancer of the skin, of the covering epithelium of the body, differs in course, prognosis, and curability so radically from cancer of the secreting epithelium and the internal organs that it is certainly disingenuous, to use a mild word, to include it under one designation with cancer of the secreting epithelium and of the internal organs. Cancer of the skin is usually of very slow growth, and is dangerous only in its latest stages; it is, in its long early stages, entirely curable by ordinary means, the curette, the knife, and caustics, without the Röntgen ray or radium, and it does not return if properly treated. In no way do skin cancers, however, differ more from affections of the same name in the internal organs than in its ready and early recognition. Long before an internal cancer would give the least appreciable symptom, cancer of the skin is readily recognizable, even to the non-expert medical man, and its very smallest beginning is evident to those accustomed to seeing dermatoses. In fact, we can even go much further than this; we can, and do, recognize dermal lesions that are prone to undergo epithelial degeneration, and by their early and perfectly innocuous removal, obviate all possible danger.

Bowen³ has on more than one occasion called attention to the importance of recognizing these precancerous conditions. The details of his observations are not within the purview of this review. In a general way, it may be said that the fourth decennium and later is the period of life in which epithelial degeneration is most likely to occur, and that warts and moles, and similar usually benign and quiescent growths, are the structures in which it is most likely to occur. Any sign of change in an excrescence which may have been present without danger for many years should be the signal for radical treatment. Sometimes this is observed by the physician; a senile wart, a papilloma, or a nevoid growth begins to increase in size, and the reason is apparent that before any distinct signs of carcinoma present themselves epithelial proliferation is beginning. There are usually subjective symptoms as well, and to

¹ Policlinico, November 21, 1915.

² Southern Medical Journal, February, 1916.

³ Journal of Cutaneous Diseases, May, 1912 and December, 1915.

these the attention of both physician and patient should be specially directed. The growth begins occasionally to give subjective symptoms; it itches; the patient scratches it; a small scab forms, which the patient pulls off, and it promptly reappears. Finally, a minute ulceration with hardened and characteristic edges is formed, and then the patient usually presents himself for treatment, with a fully-developed epitheliomatous growth. All our elderly patients with these harmless skin lesions should be warned that the very first appearance of symptoms, subjective or objective, is the imperative signal for treatment.

But we should, and in many cases we can, go much further than this. The frequency with which these conditions undergo malignant degeneration in later life is sufficiently great for us to advise their removal even when they give rise to no symptoms at all. Senile warts and papillomata of all kinds, especially upon the face and hands, should be destroyed or removed, and if that cannot be done, on account of their number, location, or the circumstances of the individual case, they should at least be kept under observation, and radical measures taken if degenerative changes should begin. We have many means at our disposal for the purpose which are readily applicable. One, however, which we should never use, and which I am sorry to say is usually the first one that the practitioner employs, is silver nitrate. This is not a caustic or destructive agent at all, especially when applied to epithelium-covered parts; it is in fact a stimulant, and promotes the very thing we should avoid, epithelial growth. The curette, the knife, the electrolytic needle, the really destructive chemical agents, acids, alkalies, arsenic, etc., may all be used in accordance with the indications of the individual cases. But by far the best for senile warts and keratoses, the commonest precancerous lesions, is the solid carbon dioxide. Any number of lesions can be treated at one session; the individual applications need not be severe, twenty to thirty seconds, with moderate pressure, being all that is needed, and the subsequent swelling can be combated with cold, wet applications. This is my standard treatment for the flat senile keratoses and warts. For the pedunculated growths, the electrolytic needle is usually the best; a current of 2 or 3 milliamperes is all that is required, and a few crossed transfixions through the base of the growth blanches it, cuts off the circulation, and causes it to dry up in a few days and be cast off. If, however, epithelial degeneration has begun, a different course should be pursued. Carbon dioxide is not deep-reaching enough, and the electrolytic needle is not certain enough to reach all parts of the growth. The curette, followed by arsenious acid, is the method of election, in my opinion; with the knife for those cases in which, from the close proximity of the growth to the eye or mouth, arsenic is inadmissible. For further information on the subject of cancer of the skin, the use of arsenious acid and carbon dioxide, etc.,

the reader is referred to the issues of this review for the years 1908, 1911, 1912, and 1915.¹

Palmar Eruptions. Sutton² has done useful work in describing and illustrating some of the commoner palmar eruptions; their diagnosis is usually easy for the specialist but they are undoubtedly often puzzling to the general practitioner. Fig. 9 shows a recurrent papulovesicular



FIG. 9.—Eczema of the palm. (Sutton's case.)

eczema of the palms, with slight scaling and exfoliation. Fig. 10 is an infectious eczematoid dermatitis. Fig. 11 is a keratosis of the palm in a case of hereditary keratosis of the palms and soles, and Fig. 12 is a chronic dermatitis of the palm occasioned by overexposure to the Röntgen rays. It would lead us too far to follow the author in his exposition of the symptoms, etiology, histopathology, and treatment of these varied cases; their reproduction may serve as a guide in some doubtful case.

¹ PROGRESSIVE MEDICINE, September, 1908, p. 104, Carbon Dioxide; September, 1911, p. 104, Skin Cancer; September, 1912, p. 108, Points in the Early Diagnosis of Cancer of the Skin; September, 1915, p. 120, The Seborrheic Keratoses.

² Journal of American Medical Association, July 31, 1915.



FIG. 10.—Eczematoid dermatitis of palm. (Sutton's case.)

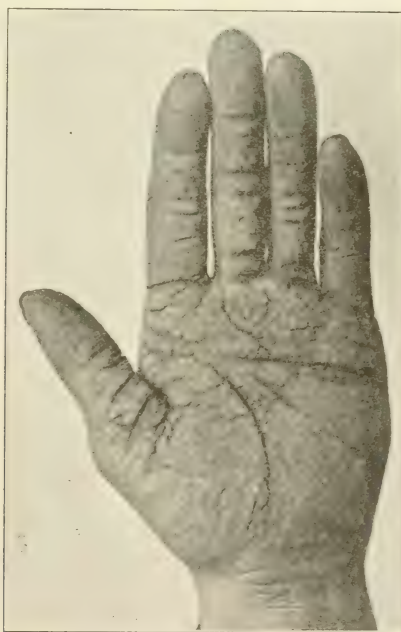


FIG. 11.—Keratosis of palm. (Sutton's case.)

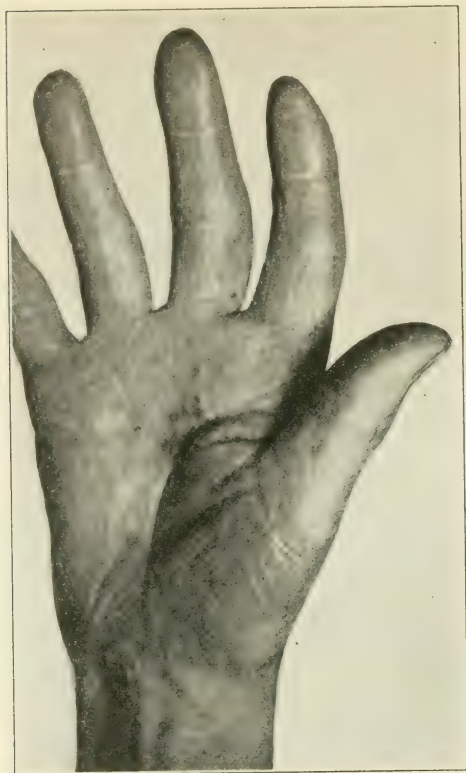


FIG. 12.—Chronic radiodermatitis of palm. (Sutton's case.)

Raynaud's Disease in Childhood. Hoyne¹ reports and figures an interesting case of this affection (Fig. 13), and gives a good review of the entire rather obscure subject. He considers the affection extremely rare; in the Cook County Hospital records, covering 30,000 patients annually, he found but 3 cases so diagnosed in the last five years. Osler states that at Johns Hopkins Hospital in twenty years, with about 20,000 cases admitted, there have been but 19 cases. Less than 100 cases have been reported in the literature. These statistics are not in accord with our experience here in New York. Cases are not very uncommon, especially in their earlier stages, in our public clinics, and among the Russian and Italian immigrant population. The etiology of the affection is still a matter of doubt, but there is a growing tendency to regard the vascular affection as one of the remoter consequences of a syphilitic infection. Raynaud himself regarded the condition as due to spasm of the arterioles due to some derangement of the central nervous system; Weiss regards the veins as the chief pathological factor. Local

¹ Journal of the American Medical Association, November 13, 1915.

structural nerve changes have been found by Pitres and Vallard. Vascular changes have been found by some authorities; Buerger designates the condition thrombo-angiitis, claiming that an enarteritis obliterans is always present; others deny the existence of these pathological findings. The entire subject deserves renewed and careful investigation.

The symptoms of the affection are sufficiently well marked. The extremities, and more especially the hands, are the parts affected, and they show three distinct stages, any one or all of which may last for



FIG. 13.—Raynaud's disease in a child. (Hoyne's case.)

years. In the first stage, that of local syncope, the affected parts are white, waxy, and swollen; they burn, tingle, or pain, and feel "dead." This is especially noticeable in winter, and the condition, at first temporary, finally becomes a permanent one. In the second stage, that of local asphyxia, the parts are cyanotic, red or purple, and the condition tends to become a permanent one, the patient suffering even in mid-summer. In the third stage, symmetrical gangrene occurs; this is usually of the dry variety, and it takes a long time for the damaged extremities to be cast off. The prognosis as to life is favorable, though

the ultimate result is usually the loss of the affected extremities. Treatment is of little avail; everything, from salvarsan and the Röntgen ray to nerve stretching and drugs, has been tried, without doing the patient any noticeable good. We are practically limited to symptomatic measures, warmth, careful massage, removal to a warmer climate, etc.

Hoyne's case occurred in the person of a child of five years, of Polish parentage; it succumbed to an intercurrent pneumonia before any operative procedures could be undertaken. There was no history of the precedent stages of the disease mentioned above; the affection occurred after a severe attack of measles, and it is questionable in my mind if the case should not rather be looked upon as one of gangrenous dermatitis of infants, such as have been recorded following varicella, undoubtedly due to systemic infection with some microbic agent, possibly the *Streptococcus pyogenes* or the *Bacillus pyocyaneus*.

Sarcoma of the Skin. This affection has not been considered in this review for several years,¹ at which time special attention was directed to the hemorrhagic or Kaposi type of the disease. An unusual form of the malady has recently been recorded by Schalek and Schultz,² in connection with which some general remarks on a somewhat confused subject will not be inappropriate. There are several distinct clinical varieties that go under the name, some of which should apparently have a different classification. There may be one or many tumors, and they may be pigmented or non-pigmented, melanotic or hemorrhagic. The prognosis also is entirely variable in the different cases; some are rapidly fatal, while others may last for many years, progressing very slowly and not interfering much with the patient's working capacity. A tumor or tumors of the skin are present in all cases, and the microscopic distinction between the different varieties is a matter concerning which even the professed dermatopathologists are at variance. Under these circumstances, some broad, general, and readily appreciated differentiation is required. With the hesitation natural in attempting to classify the material in a subject so difficult, I propose the following as practically useful.

1. The idiopathic, diffuse, pigment sarcoma of Kaposi appear as purplish nodules or diffuse infiltrations chiefly on the extremities, progressing very slowly indeed, with little tendency to ulceration or metastasis, and little deleterious influence on the general condition. It is questionable whether this condition should be classed under the sarcomata at all, but the designation has been so generally accepted that it is probably inadvisable to attempt to change it.

2. Diffuse sarcomatosis with multiple non-pigmented tumors running a chronic course, with tendencies to ulceration and metastasis. This

¹ PROGRESSIVE MEDICINE, 1910, p. 126.

² Journal of the American Medical Association, June 5, 1915.

may be regarded, for all practical purposes, as identical with mycosis fungoides.

3. True sarcomā cutis with multiple non-pigmented tumors secondary to a primary tumor in the skin or in the internal organs; malignant, rapid course; tendency to local ulceration and to internal metastasis (Fig. 14).

Schalek and Schultz's case was one of true generalized sarcoma of the skin. Its course was extremely acute, six weeks only intervening between the time when he noticed the first small subcutaneous tumor on the inside of his left forearm and his death. There had been a small papillomatous pigmented tumor at the site of the first lesion



FIG. 14.—Sarcomatosis cutis. (Schalek and Schultz's case.)

which had been there for many years without appreciable change. At the time of his death, there were over 500 visible skin nodules, in addition to very many palpable but invisible tumors. The autopsy showed innumerable sarcomatous nodules in the mediastinal, omental, mesenteric, and retroperitoneal tissues; the parenchyma of the internal organs and the lymph nodes showed no tumors. The primary sarcomatous tumor in this case was undoubtedly the papillomatous lesion of the forearm.

Xeroderma Pigmentosum: Its Treatment with Autogenous Serum. Two cases of this rare affection are described by Kessler¹ (Fig. 15). As is

¹ Journal of the American Medical Association, July 24, 1915.

usually the case, they had been treated for a long time for eczema, etc., without result, though the recognition of the true nature of the affection did not help the patients much. The face, hands, arms, and legs, the parts exposed to light in these children, were, as is always the case, the regions affected. The changes in the affected integuments were extensive thinning of the skin, telangiectases, pigmentations, and tumor formation with beginning epithelial degenerative changes. It is recognized that this form of degeneration of the skin is directly due to the

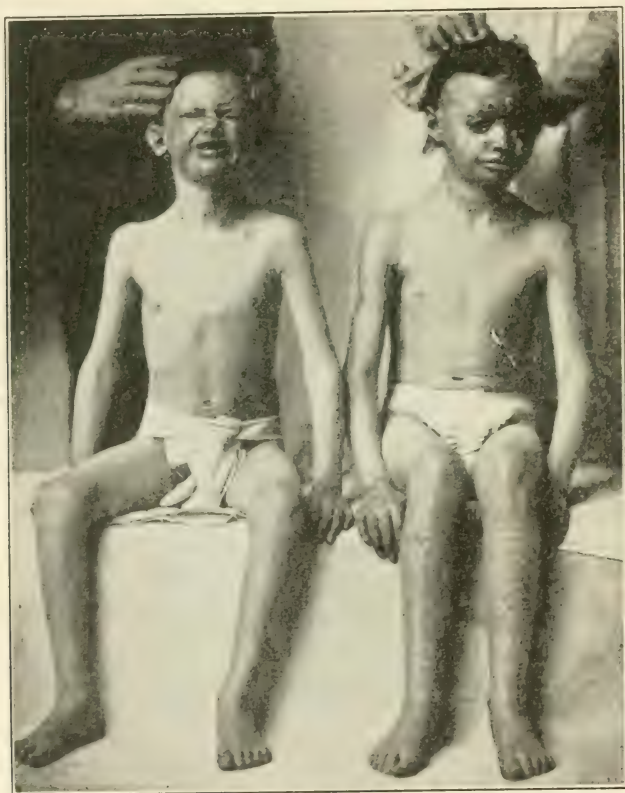


FIG. 15.—Xeroderma pigmentosum. (Kessler's case.)

influence of the violet and ultraviolet light rays on a predisposed or hypersensitive integument. This integumental peculiarity is hereditary. Hyde reported some family groups of the disease some years ago, and these 2 patients are brother and sister, though there are no other cases discoverable in the family. Kessler reports marked improvement in the patients' general condition from the autogenous serum injections, though he does not expect cures to result. In the entire absence of any other means, it may be tried. Otherwise, protection of the skin from light, to prevent further damage, if possible, and local treatment

in the way of removal or destruction of the growths when necessary, together with emollient and sedative applications, are the only remedies to recommend. The resemblance of this condition to that observed in the skin after damage by the Röntgen ray is so marked that I have no hesitation in saying that the two are the same. Chronic radiodermatitis, with its atrophies, telangiectases, pigmentations, and epithelial degenerations is practically a xeroderma pigmentosum, and is due to the same causes.

SYPHILIS.

Arsenobenzol and Diarsenal. It was evident when the European war broke out that if it lasted for any length of time it would occasion a scarcity of some of the many drugs for the supply of which we had been accustomed to rely on Germany, and even prevent their importation entirely. The immediate future of the salvarsan supply was naturally of especial interest to the syphilographer, for the use of this drug has become a matter almost of routine in the treatment of lues. No matter what our opinion might be as to its efficacy as a curative agent, the patients demand it, and we must use it. Incidentally, I may say that I have seen no reason to modify the position that I took some years ago as regards the new drug. It does not, in the great majority of cases, cure syphilis any more than mercury does; sometimes it is more effective, and sometimes less effective, than the latter drug; and the best plan of treatment now is to use both drugs rationally, placing our chief reliance, however, on the mercury, and not neglecting iodine in the later stages of the infection. For the past two years, however, no salvarsan has come here; the available supply was soon exhausted, and prices ran up to \$50 for a single full-dose tube of either the new or the older forms of the imported drug. Under these circumstances, attempts were naturally made to manufacture the drug here, and with very considerable success. Arsenobenzol, the American, and diarsenal, the Canadian salvarsan, are now available. Personally, I have had no experience with either. When the war broke out, I took the precaution to lay in a rather large quantity of both salvarsan and neosalvarsan, and I still have a sufficient supply. A number of authorities, however, have reported on the new substitutes for it, and something definite can now be said on the subject. I select a few out of a number of pronouncements on the subject.

Gardner¹ has given over 300 doses of diarsenal, and finds that it differs but little from salvarsan. Only in three patients was there any reaction; a proportion that compares favorably, in his experience, with the German drug. He has come to the same conclusion both as regards the clinical results and the effect on the blood reaction. The technic

¹ Journal of the American Medical Association, April 22, 1916.

is exactly the same as that employed for salvarsan injections, but solution of the Canadian drug seems to be more difficult; some investigators have found it necessary to have recourse to the now discarded glass beads that were formerly employed, and others recommend filtration of the dissolved drug before its injection. It is not easy at present to get diarsenal here, and some bad results have already been reported. Thus, Cook¹ records 3 cases in which poisoning occurred, out of a total experience of 16 diarsenal injections. The symptoms were those of a chemical poison acting directly, or through the suprarenals, on the vasomotor centre; and though no deaths occurred, the symptoms were alarming, and it was several hours before the patients were in condition to go home. For these reasons, as well as for others to be referred to later, I prefer the American drug.

We owe this preparation to the efforts of the Dermatological Research Laboratories of the Philadelphia Polyclinic, made under the direction of Dr. Jay F. Schamberg. The name arsenobenzol, though really belonging to a compound closely related to salvarsan but not identical with it, has become so well established in chemical nomenclature that it seemed wiser to adopt it for the compound rather than the correcter designation of aresenphenolamin hydrochloride, though this latter is the one used by the Council on Pharmacy and Chemistry. The laboratory, originally endowed for the purpose of psoriasis research, realizing after the war began that a more immediately important and fruitful field of work lay before it, has devoted its efforts since that time very largely to chemotherapeutic investigations in the field of syphilis therapy. In view of the shortage of salvarsan occasioned by the war, the laboratory decided to make and sell salvarsan under its generally accepted chemical name. In so doing, of course, it encountered the vested interests of the German manufacturers of salvarsan, who have a trade-marked and proprietary preparation. It was evident, however, to the German monopolists and their representatives here, that no court of equity would issue an injunction against the manufacture and distribution of a drug that was saving life and conserving the public health at a time when such drug could not be supplied by the patentees. The Dermatological Research Laboratories of the Philadelphia Polyclinic are therefore now prepared to supply the drug, and have fixed the price at the antebellum figure at \$3 per tube containing 0.6 gram, and \$2.50 per tube containing 0.4 gram. Hospitals and dispensaries can obtain it at a lesser price. It was the desire of those in direction of the laboratories to further reduce the price of the drug; but legal advice to the effect that such reduction might ultimately injure the market of the patentees, has for the present restrained such action. The pledge is given that any profits that may accrue from the sale of this drug

¹ Journal of the American Medical Association, March 18, 1916.

shall be exclusively devoted to the establishment of a fund for further scientific research, and no part thereof shall inure to the benefit of any individual.¹

Arsenobenzol has now been employed in hundreds of cases by its makers, with excellent therapeutic results, and with no reports of any accidents or untoward complications. Like diarsenol, it is slightly less soluble than the German product, and the solution requires to be filtered. It is prepared otherwise in the same manner as salvarsan, and must be neutralized by the addition of sodium hydroxide solution. The toxicity tests on animals and the therapeutic tests on rats infected with experimental tripanosomiasis give substantially the same results as those obtained from the Ehrlich product. Reports from other observers are, in general, equally favorable. Ormsby and Mitchell,² for instance, have used the new drug on 75 patients, and formulate the following conclusions:

1. Arsenobenzol, together with mercury, offers as good a method of treatment of syphilis as any heretofore used.

2. In its uniform and non-toxic action, arsenobenzol commends itself as a remedial agent of great value in the treatment of syphilis, and its successful preparation marks an achievement in American chemotherapy.

3. While a sufficient experience has not yet been had from which to draw ultimate conclusions, we believe its therapeutic accomplishments, together with its safety of administration, recommend its continued employment.

Finally, it has been reported to me that at the recent meeting of the American Dermatological Association at Washington, May 8 to May 10, which I was unable to attend, arsenobenzol was officially endorsed. One thing must be remembered both as regards this drug and diarsenol: they are both of them substitutes for the original salvarsan, not for neosalvarsan. They are therefore not suitable for intramuscular injection in the occasional cases in which the intravenous method cannot be used. For these, until an American neosalvarsan is prepared, we must rely on the older drugs.

Syphilis Hospitals. Stokes details the arrangements that have been made at the hospital of the University of Michigan for the care of cases of syphilis, and incidental thereto discusses the advisability of a special hospital for the care of this disease as compared with treating it in general institutions. Undoubtedly, there is much to be said on both sides of the question. When we have, as will undoubtedly be the case some time, larger institutions devoted to the care and study of this disease, the amount of material available for study and experiment

¹ Journal of the American Medical Association, December 18, 1915.

² Ibid., March 18, 1916.

will have much effect in extending and popularizing our knowledge of the affection. There is no doubt, however, that the inevitable, though unjust, popular stigma that will accompany entrance into such an institution will militate greatly against its usefulness. On the other hand, syphilis is certainly a disease that can be well and properly treated in a general hospital, provided that proper arrangements are made for its care. Its contagiousness is limited, and can be quickly brought under control by treatment, and with proper regulations, there is no danger at all of its spread. From the patient's view-point, a general hospital, where all manner of affections are treated, is far better than one devoted to syphilis alone, and from that of the physician, an institution where the staff is trained in the whole field of general medicine and surgery is better than one devoted to a specialty alone. There must be special wards, however, for those infected, and the service must be large enough to enable a general knowledge of this protean disease to be obtainable. Special wards for syphilis, designated, if possible, by some other and less socially objectional name, can readily be established. At Ann Arbor the arrangement is as follows:

The wards devoted to syphilis are called dermatological wards, and the house staff is composed of men who have already had a year of general hospital service, and who serve on the special service for from two to four years to prepare themselves for the specialty. The junior of this staff, as resident, has entire charge of the ward care of the patients; the senior, as a paid, full-time instructor in the university, under the direction of the professor of the department, examines all patients seen at the clinic, conducts the treatment of the out-patients, administers salvarsan, and carries out such operative procedures as are required. Patients on this service, therefore, get the benefit of the care of men primarily interested in the condition for which they seek relief, and equipped with an amount of experience in it which the ordinary rotating service interne does not possess, and for which the average attending physician often cannot spare the needed time or detailed attention. If the patients are suffering from other affections as well as from syphilis, they are transferred to their proper service as soon as the immediate indications are met, and there their antisyphilitic treatment is continued with the coöperation of the dermatological service. In this way, in addition to the patients in their own beds, the service assumes a measure of responsibility for cases undergoing other forms of treatment in other parts of the hospital. If the patient does not need care in another department of the hospital, he is presumably discharged and referred to the out-patient department, though nothing is said in the description about this special phase of the subject. It is manifestly impossible, however, to keep these patients as hospital inmates during the entire period of syphilis treatment, nor is it necessary.

I entirely agree with Stokes in his conclusions that the special venereal

hospital, hampered as it will be for a long time, if not always, by the prejudice which its name and functions create, will serve the campaign against syphilis much less efficiently than the inconspicuous hospital unit in a general institution, which experience is rapidly demonstrating to be a practical, valuable aid in the work of the hospital as a whole and in the general struggle against syphilis as a disease.

Syphilitic Aortitis. The serological tests for the presence of syphilis undoubtedly help us both in diagnosis and in prognosis and treatment, but they have also necessarily caused new difficulties in handling the disease. No problem is commoner, both for the syphilographer and the general practitioner, than the case of the old syphilitic who keeps his permanently or temporarily positive Wassermann in spite of all our efforts to eradicate the contagion, and possibly in the entire absence of others, either objective or subjective evidences of disease. Under the old dispensation the problem was simpler. An infected case was treated by the approved methods and for a length of time that experience had shown was requisite. If the case showed no symptoms thereafter, it was regarded as cured, and in most cases, so far as our knowledge then went, it was cured. A certain minor proportion of the cases showed symptoms of lues in later life, but they were no longer contagious or liable to procreate syphilitic children, and we necessarily regarded them as an unavoidably uncured residue of small amount. Most of our treated syphilitics married did not infect their wives, had healthy children, had no tertiary symptoms, and died of some apparently non-luetic disease at last.

Our views on these important points have undergone change, and are still undergoing it. The persistence of the infection in very many apparently cured cases is revealed by the blood test; cerebral and spinal affections of formerly unknown etiology, such as tabes and paresis, are generally recognized now as always syphilitic in origin, and the list of diseases of later life that originates from the infection is constantly increasing. The pale spirochete has taken the place of the tubercle bacillus as the most important factor in the morbidity and mortality of civilized life. I myself have come quite definitely to the conclusion that a persistently positive Wassermann means, in practically every case, activity of the virus somewhere, and is the harbinger of future trouble. I may be quite unable to locate it, but it is present somewhere.

Very important work in this connection has been done by Larkin and Levy.¹ The internists are now generally recognizing the connection between the vascular defects that are so common in later life and the specific infection, and especially is this the case with affections of the aorta and larger arteries. The investigators examined 42 aortas of patients whose blood had been tested serologically before death; 19

¹ New York State Journal of Medicine, December, 1915.

of these gave positive Wassermanns; 23 were negative. Of the 19 positive cases, 17 aortas gave microscopic evidence of syphilitic aortitis, being 90 per cent. of the entire number. It is interesting to note that 15 of these 19 died as the direct result of a syphilitic process, about 80 per cent.; and 11 of the 19 died from their syphilitic aortitis, about 60 per cent. Of the 4 patients dead from syphilis other than syphilitic aortitis, was 1 case of syphilitic cerebral endarteritis, 1 of meningomyelitis, 1 of tabes, and 1 of ulcerating gumma of the larynx. Of the 4 patients with positive Wassermanns dying of non-syphilitic conditions but showing perivascular infiltration, 2 died of carcinoma of the bronchus, 1 of chronic ulcerative tuberculosis, and 1 of interstitial nephritis. The conclusions that Larkin and Levy draw from their investigations are far-reaching. They deem it highly probable that about 90 per cent. of individuals dying with a positive Wassermann, if the infection is not of recent origin, have, at least histologically, a syphilitic aortitis; that about 60 per cent. of them die from their aortitis, giving clinical evidence of cardiac decomposition or rupture of an aneurysm, and that about 80 per cent. of these individuals die of syphilis. Since only 1 case of perivascular cellular infiltration gave a negative Wassermann in their series, it is fair to assume that 94 per cent. of individuals suffering from syphilitic aortitis would give a positive reaction in their serum.

Symmers and Wallace¹ have also investigated the subject of syphilitic aortitis, and while they admit that the lesion is specific in its origin, they claim that intercurrent disease, especially infections, such as acute rheumatica arthritis, alcoholism, and occupations entailing prolonged physical strain, play a part in its causation. In untreated or neglected syphilis, the average time between infection and death with anatomic confirmation of the existence of syphilitic aortitis they found to be 20.5 years, from which fact it is apparent that, even under the least favorable circumstances, the lesion arises late in the course of the disease. About 30 per cent. of all patients with syphilitic aortitis were found to have developed aneurysm, and in about the same proportion sclerosis and retraction of the aortic valves occurred. Gruber² has studied 120 cases of syphilitic aortitis, with 27 autopsies; he found aneurysm present in 24 out of 120 cases. He estimates at 5 or 6 per cent. the number of cases of syphilitic aortitis found in the general autopsy list, showing the prevalence and importance of this lesion. Lian and Vernes³ conclude that in every case of aortic lesion, if the patient has not had a distinct acute articular rheumatism, the origin of the trouble is specific. Gaucher and Brin,⁴ after fifteen years' study

¹ Journal of the American Medical Association, February 5, 1916.

² Syphilitic Aortitis, G. Fischer, 1914.

³ La Presse médicale, March 14, 1914.

⁴ Annales des maladies veneriennes, February, 1914.

of aortitis, hold that its origin is syphilitic in more than 85 per cent. of the cases. They make a strong plea for ever-repeated courses of treatment with mercury and iodine in these cases, no matter how thorough the original treatment may have been.

Much more evidence to the same effect might be cited, but the above will suffice to show the importance of the subject. From the standpoint of the practical physician, we are forced to the conclusion that a persistently positive blood reaction is evidence of trouble from the spirochete action somewhere in the body; that in the absence of evidence of this in the skin, mucosæ, and nervous system, the next place to look for it is in the heart, and especially the aorta; and that treatment with mercury and iodine for indefinite periods is our only hope in combating the trouble.

SYPHILIS WITH NEGATIVE WASSERMANN. That manifest syphilis may occasionally be present and the patient's blood be negative to the Wassermann test, even after provocative treatment, is a fact that is not generally appreciated. Three years ago I had a patient on my service in the City Hospital with indubitable secondary symptoms of a malignant type in whom over 20 careful Wassermanns, some made before, and others after, treatment was instituted, gave a uniformly negative result. Fonss¹ has investigated this phase of the subject with care, using 243 cases of manifest syphilis in which there had been, up to the time of investigation, no attempt at treatment. In 172, the lesions were those of the secondary stage of the disease, and in 20 in the tertiary stage. Of these two groups with manifest specific lesions, the Wassermann was negative in 10 of the 172 secondary cases, and in 4 of the 20 tertiary cases. He urges the necessity for repeated blood examinations, especially if the reaction is negative and at variance with the evident symptoms. He concludes that, even in untreated syphilis, a negative Wassermann is not very uncommon, placing the proportion as high as 10 per cent. All of which sustains the contention that I have repeatedly made in these columns. A positively resulting test is never indubitable evidence that the lesion being considered is syphilitic, nor a negative test that it is not caused by the infection. It is presumptive evidence only, and is useful to sustain a diagnosis or the reverse.

PROBLEMS OF SYPHILITIC REINFECTION. Under this caption Paroungian² discusses some of the reinfection cases that are on record, and details in connection therewith a case of his own. True cases of reinfection, of course, are of importance, since they are the only absolutely indubitable evidences of the cure of syphilis that we can obtain. Not the absence of symptoms for years or for life, not the procreation of healthy offspring, not even repeatedly negative blood tests, can be

¹ Ugeskrift for Læger, November 11, 1915.

² New York Medical Journal, January 22, 1916.

regarded as absolute proof of sterilization of the body, though, of course, for practical purposes, we must be, and are, content with the evidence thus obtained. According to our present knowledge, however, a reinfection that is undoubted presupposes an absolute cure of a precedent infection.

Parounagian rightly calls attention to the fact that reinfection is too readily diagnosed, and that the evidence of the fact, especially

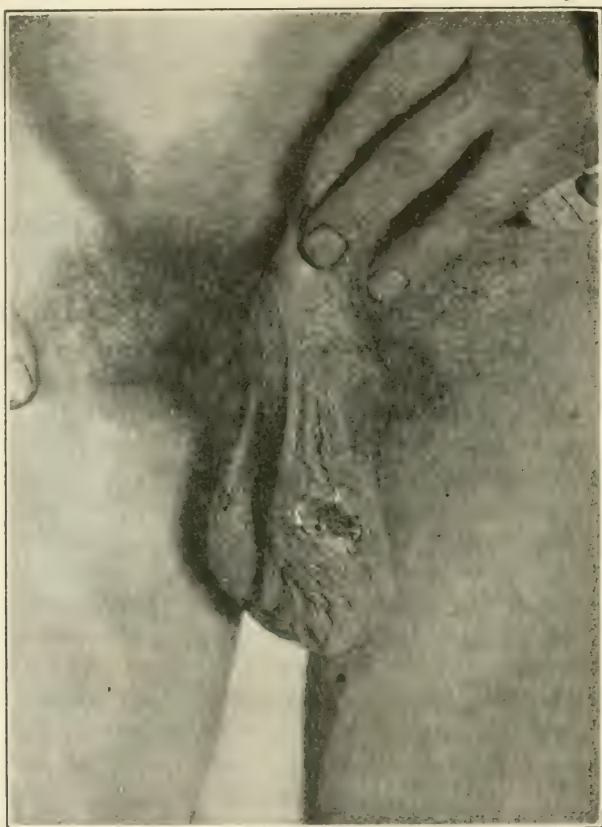


FIG. 16.—Scrotal chancre. (Parounagian's case.)

since the introduction of salvarsan, the blood test, and the discovery of the spirocheta, is in many cases insufficient. The disappearance of the organisms from the lesion and the absence of symptoms or a positive blood test are not in themselves sufficient criteria of cure. I may call attention to the fact that in the older days there was a well-recognized lesion of secondary and tertiary syphilis known as the chancre redux. In a certain and not extremely small proportion of cases there appeared at the site of the original initial lesion a more or less sclerosed and possibly

exulcerated lesion that resembled a chancre, but which was merely a secondary phenomenon. It is more than possible that some of the so-called reinfection cases belong in this category. Parounagian's case,

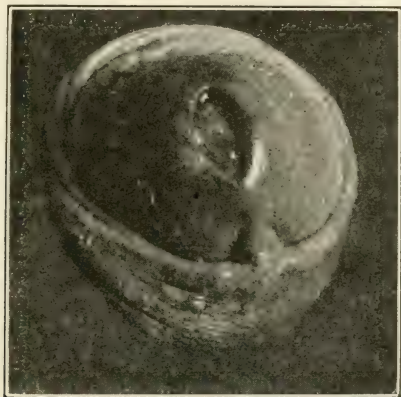


FIG. 17.—Meatal chancre. (Parounagian's case.)

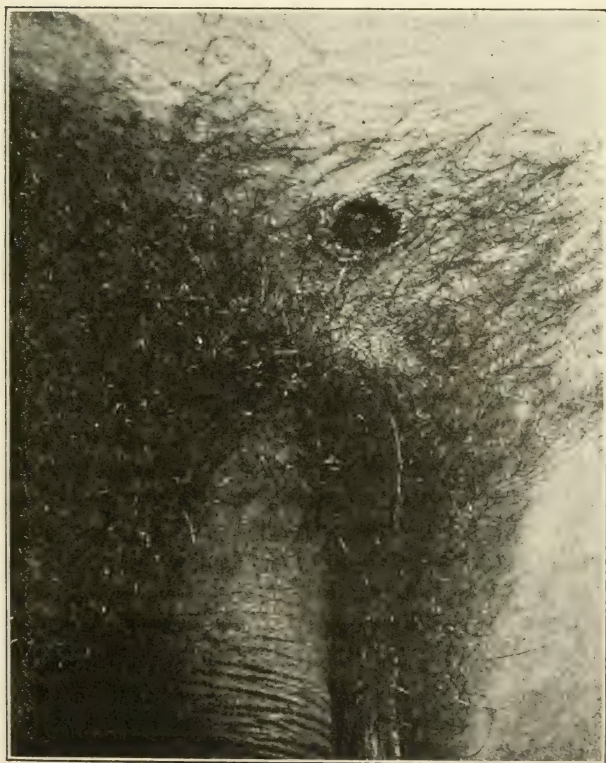


FIG. 18.—Pubic chancre. (Parounagian's case.)

however, seems beyond cavil. The patient had a scrotal chancre when he was first seen on March 5, 1914, the diagnosis being confirmed by spirochete findings (Fig. 16). The infection was a multiple one, a few days later a meatal chancre making its appearance (Fig. 17). In due course a general adenopathy, a maculopapular syphiloderm, etc., appeared. The treatment during the late spring and summer consisted of salvarsan intravenously and mercury salicylate intramuscularly, with some iodide of potassium in the fall. His Wassermann became negative, and all symptoms disappeared. At the end of December of the same year he reappeared with a lesion on the pubic region which presented all the appearances of a true sclerosis (Fig. 18), and for diagnostic purposes, was given no antisypilitic treatment at all; at the proper time he had another roseola, followed again by the regular symptoms of a fresh infection. He was given another salvarsan-mercury course much more prolonged, and by October 27, 1915, his blood reaction had become negative again.

THE WASSERMANN DIAGNOSTIC TEST. Interest in the serodiagnosis of syphilis is so great, the literature of the subject so large, and the views as to its significance so diverging, that a review of syphilis during the past year would be incomplete without some reference to the subject. Two years ago,¹ I referred to the great desirability of standardization in the methods of making and recording the test; I cannot say that any great progress has been made in that direction during the time that has elapsed since then. Five years ago,² I formulated certain conclusions with regard to the test which were considered as almost too conservative, but which are, in the main, those accepted today. A brief review of our present stand-point with regard to the test will be given, based, among many other articles, on those of Fordyce,³ Moore,⁴ Whitney,⁵ as well as on my own experience.

In the first place, experience is necessary in the interpretation of Wassermann results; the mere report of a laboratory, or possibly of a drug store imperfectly equipped, is not sufficient to establish a diagnosis of syphilis in the affection under consideration. Partial or transient complement-fixation is sometimes seen in leprosy, yaws, and certain cachectic states; of which leprosy is the only condition that is of importance to us here. Fordyce states that in the cases of lepra that have come under his observation, the serum reaction has not been uniform, some cases giving the reaction at one time and not at another, or being negative or indeterminate with one antigen while inhibition may be complete with another. An indeterminate or weakly positive reaction

¹ PROGRESSIVE MEDICINE, September, 1914, p. 161.

² *Ibid.*, September, 1911, p. 146.

³ New York Medical Journal, September 26, 1914.

⁴ Journal of the American Medical Association, December 4, 1915.

⁵ *Ibid.*

is of little importance for diagnosis unless other and definite luetic symptoms are present, though it may be used as an indication for treatment; a provocative salvarsan injection may be used to bring it out. On the other hand, the reaction may be negative in undoubted syphilis where the lesions are tertiary and limited, in old infections with involvement of the nervous system, in women who have had repeated abortions, and in syphilitic children with remote or treated infections; even alcohol, says Fordyce, will sometimes prevent complement-fixation if taken prior to the test.

In primary syphilis, the blood test has comparatively little value, since complement-fixation does not take place until, or just before, the secondary symptoms appear. Nevertheless, in cases in which the spirochete cannot be found and the clinical picture is doubtful, repeated Wassermanns should be made to obtain positive evidence at the earliest possible moment.

In secondary syphilis the Wassermann is positive in every case, but it is precisely secondary syphilis, with its usually very manifest symptoms, that we least need its aid. It is valuable, of course, in the rare cases in which the skin, mucosæ, and general symptoms are doubtful.

Tertiary cases, untreated and with manifest symptoms, give a positive reaction in 95 per cent. to 100 per cent. of the cases; treated cases, and those not showing manifest symptoms, are positive in much smaller proportion. Here again the test is liable to fail us in the very cases that it is most important to us. It is of value, however, especially as an aid in the differentiation of syphilis from tumors and other surgical conditions, but it must never be forgotten that it is presumptive evidence only as to the nature of lesion under examination. Knowing as we do that a patient who has once had syphilis may have a positive complement-fixation at any time thereafter, and that the presence of this infection does not preclude the occurrence of carcinoma or any other surgical condition, it is very evident that the laboratory result can only be accepted as one element, and not the most important one, in making the diagnosis. It does not seem to me that in this respect the blood test has any very great advantage over the old therapeutic test; a few doses of mercury or salvarsan will settle the matter as quickly as the test, and more to the patient's advantage if syphilis is present. I have long taught that in every case in which there was the least possibility of doubt, and especially in every case of internal tumor, the patient should be given a short but vigorous mercurial course before being subjected to operation. It will do him no harm, and it may save his life.

In patients with symptoms of syphilis of the central nervous system, as well as in cases with persistently positive blood and no special symptoms, lumbar puncture and examination of the spinal fluid is indicated. In tabes, the blood reaction is positive in from 60 to 70 per cent. of the cases, the spinal fluid is positive in much larger proportion of cases,

approximating 100 per cent. When the degenerative changes have occurred, however, and no active process is going on, the results of both blood and spinal fluid examinations are usually negative. In a general way, the same reaction results are seen in paresis and cerebrospinal lues.

As regards the proportion of cases that the blood shows to be refractory to treatment, and as to the extent to which we are justified in continuing to treat such patients, most authorities are discretely silent. I have come to the conclusion that the only thing to do is to place the matter squarely before the patient and let him decide. Patients that have what experience has shown to be sufficient treatment, and that still have an occasionally or permanently positive blood or spinal fluid, I advise taking a short mercury or salvarsan-mercury course once a year for an indefinite time, as long as their patience lasts. I do this in accordance with our modern ideas as to the disease and the remedies we employ to combat it; it remains questionable to me, however, whether the patients will be any better off, or our end-results any more satisfactory than they were in the times when, after having given the patient a sufficient treatment, and after he had remained without any signs of the disease for a number of years, we dismissed him with the assurance that his disease, so far as we could see, was cured. It was true in the great majority of cases, and it may well be doubted whether we are doing what is best for an afflicted human being when we dismiss him with the verdict that he is incurable, and must bear his cross as long as he lives, and submit to indefinite treatment. For the experience of over thirty years enables me to say that the great majority of my old syphilitics have remained cured; some are living still, others have died of affections entirely unrelated to their old infection; only a very few have, to my knowledge, suffered from the late lesions of the disease. Individual experience, of course, even of a lifetime is insufficient to establish such facts; but even if half of our syphilitics never hear of their syphilis again, it seems to me that, given a proper and sufficient treatment, it might be better to tell them that they are cured no matter what their blood reaction may be.

OBSTETRICS.

By EDWARD P. DAVIS, M.D.

PREGNANCY.

The Prognosis of Sterility. Reynolds¹ publishes a paper read before the Association at its annual meeting in San Francisco, in which he considers at length the prognosis of sterility. He has found it impossible to gain accurate information through statistics because accurate observation of these cases is by no means common.

He suggests, as a classification, those cases which are dependent on absence or inferior quality of the ovum; those which result from secretions in the genital tract destructive to either the ovum or spermatozoa and those which are due to absence or inferior quality of the spermatozoa.

Cases organic in nature occur in all these classes, as do also functional cases and those resulting from abnormal constitutional conditions of the individual. All of these make then at least six classes of cases.

So far as functional cases are concerned, we obtain our knowledge largely through observation upon animals. Unquestionably, in both sexes, fertility is decreased by obesity and excessive overwork. So, marked nervous excitability has a similar effect. In the human subject, excess of mental work may diminish fertility and also the excessive use of alcohol and the extremely excessive indulgence in tobacco.

We recognize altered secretions in the genital tract of the female as frequently producing sterility.

In investigating a patient, it is of importance that a careful history be taken, which shall embrace the details in the health of both husband and wife. A thorough local examination should be made and especial attention paid to minor abnormalities, which may not in themselves seriously threaten the life or general health of the patient. When an examination of both patients has been made, the effort should be instituted to obtain the secretions of the genital tract after recent intercourse. In this manner knowledge can be obtained which cannot otherwise be arrived at.

So far as the prognosis is concerned, it will obviously depend upon the presence or absence of any grave condition affecting the health of either husband or wife. When this point has been determined, the most

¹ Journal of the American Medical Association, October 2, 1915.

probable cause of the sterility will be found in one of the factors which have been enumerated. The fact remains that we are ignorant concerning the chemistry of many of the vital fluids of the body and of its most important secretions, and this fact may prevent our arriving at an accurate knowledge concerning some of the obscure cases of sterility.

The Diagnosis of Pregnancy. In the preceding volume of *PROGRESSIVE MEDICINE* (September, 1915), in reviewing our progress in the diagnosis of pregnancy, we abstracted material which showed that the Abderhalden test for pregnancy is unreliable, because it may give a positive reaction in malignant disease when pregnancy is absent. Ball and Leitch contributed papers of especial value upon this point. Similar reports from Continental observers indicated this source of error in the Abderhalden method.

Van Waasbergen¹ has studied the reaction obtained by the Abderhalden test in patients who were not pregnant. In the laboratory of van der Hoeven the writer examined, by the Abderhalden method, the sera of 69 patients who were not pregnant. The sera, in accordance with this method, were taken and then treated by the centrifuge, so that they were absolutely free of hemoglobin, as tested by the spectroscope. The method of dialysis was employed and especial precautions taken to carry out the technique completely. A placental extract was prepared in the most thorough and exact manner. Ninhydrin was used in the manner described by Abderhalden.

Of these 69 sera, but 7 gave a negative reaction. In 4 that remained negative, it was found that these were patients who had passed the menopause and suffered from prolapse, while 3 others remaining negative were aged fifteen, sixteen, and forty-one years, respectively.

The 69 patients were divided into groups; from fifteen to twenty-five years of age and from twenty-six years and up. In the first were 20; in the second, 48. In the first group, 55 per cent. gave a well-marked positive reaction; 35 per cent., a weak positive reaction; 10 per cent., a negative reaction. In the second group, 37.5 per cent. gave a positive reaction; 52 per cent., a weak positive reaction; and 10 per cent., a negative reaction. After dialysis had been employed, with a temperature 38.5° C. in the first group, 9 per cent. gave a positive reaction and 10 per cent. a weak positive reaction, and none a negative reaction. While, in the second group 50 per cent. gave a positive reaction; 41.5 per cent., a weak positive reaction; and 8.5 per cent., a negative reaction.

From this, it is seen that not only has temperature to do with the reaction, but also the age of the patient, as the well-marked positive reactions were seen more often in the younger patients. In view of these facts, it is not strange that Lange, in a patient suffering from

¹ Monatschr. f. Geburtsh. u. Gynäk., 1915, Band xliii, Heft 2.

febrile disease such as tuberculosis and suppurative diseases, had from 30 to 65 per cent. of his cases give positive reactions. If we believe that fever marks increased metabolism, it is not irrational to have the Abderhalden test give a positive reaction.

In the light of this observation, it is not at all strange that the blood serum of a pregnant woman should give a positive reaction. The writer's experience, however, indicates somewhat differently. In 41 patients he obtained data concerning menstruation. In 7, the period was said to be present or just about to develop. When the 41 patients were divided into groups regarding this function, it was seen that the Abderhalden test became more intense as the time of the period approached and that as soon as the period had developed, or immediately afterward, the reaction became much weaker. Observations made with blood serum from young girls in whom menstruation had not developed, showed a negative reaction. Remembering the analogy which exists between the decidua of menstruation and that of pregnancy, and its relation to the formation of the corpus luteum, the behavior of the Abderhalden test is explicable.

Baumann¹ has studied the Abderhalden test in von Herff's clinic in Basel. He reviews the technique of the test and employed the method of dialysis and the use of ninhydrin. In common with others, he found it very important to obtain the proper cups for dialysis or capsules. It was also necessary to be exceedingly careful in obtaining the blood of the patient. The preparation of placental extract is always a matter of very strict technique. He mentions placental extract prepared by the Hoechst method in both the dry and moist preparation. He tabulates 159 observations, including normal pregnancies, examination of blood taken from the umbilical vein, cases of the puerperal period, abortion, ectopic gestation, eclampsia, and blighted ovum.

A series of cases, not pregnant, were then examined, including one male subject, and a negative reaction was obtained from these. He describes some involved cases in which the method proved of value in making a differential diagnosis. He feels justified in concluding, from his study of the subject, that if placental abstract be carefully prepared, and the method of dialysis with ninhydrin reaction be employed, accurate results are usually obtained. He also had good results with the dry Hoechst preparation of placental albumen and used 0.5 to 0.25 grams. The moist placental preparation of Hoechst gave 40 per cent. of erroneous results. So, too, the reaction obtained by what is termed colored placental extract, gave a negative result. He found the method of especial value in cases in differential diagnosis. A careful and generous estimate of the failures of the method gave 1.5 to 2 per cent. in ordinary cases and from 3 to 4 per

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xliii, Heft 3.

cent. in complicated cases. In his experience, but two especially significant failures occurred. One was a tubal pregnancy where the blood was taken directly from the opened abdomen and the other was a case of pregnancy complicated by a myoma and in both it was thought that errors in technique of the examination were responsible for the result.

Ebeler and Löhnberg¹ believe that the reason for the widely differing results obtained in the Abderhalden test lies in the failure to carry out strictly the technique advised by Abderhalden. It is necessary that the dialyzing capsules be made absolutely sterile without injuring their functional value. The writers have recently tested materials obtained from carcinomata, and also the connective tissue of the kidney. In their last series of investigations, 160 cases were examined without the use of placental extract. In 11 cases of ectopic gestation, 6 gave a positive and 5 a negative ninhydrin reaction. That the test is inaccurate under these circumstances may be seen from the fact that material taken from a hematoma can give a positive reaction with placental tissue. In 39 cases of normal pregnancy, the test was positive with one exception, in a patient where there was very marked disturbance of metabolism. In gynecological patients, the non-pregnant gave a positive reaction in 19.6 per cent. when placental extract was employed. Cases of fever, or those having tumors, were especially liable to give a positive test. In cases of carcinoma, 82 per cent. gave a positive reaction. The writers would employ this test equally in the diagnosis of pregnancy and carcinoma.

Steiner² has found it difficult to obtain an absolutely positive result with this method in many cases. There are so many organic conditions which may vitiate the final issue. In carcinoma, the test is almost invariably positive. The principle of the test remains correct, namely, that it calls attention to a marked variation from the ordinary metabolism of the individual.

Keitler and Lindner,³ in 24 cases, used placental extract alone in 19. One case gave a negative result with the old substrata; a second was doubtful with carcinoma; a third positive with carcinoma; a fourth with serum only gave a positive reaction to protiodide with placental and carcinomatous material. In 21 cases in which pregnancy had terminated, the reaction was positive in 11. In cases of pregnancy in which negative results were given, and the patients came to delivery, microscopic examination of the placenta showed that it had practically ceased to perform its functions. In 27 carcinomatous patients, a well-marked positive reaction was given in 15. It is thought that the fact that metastases do not readily develop in carcinoma of the cervix,

¹ Berl. klin. Wehnschr., 1915, No. 13.

² Ztschr. f. klin. Med., 1915, No. 17.

³ Wien. klin. Wehnschr., 1915, No. 21.

accounts for the uniformity of the reaction in these cases. Of myomata there were 21 cases, with a positive test in 11. For the substrata in these, albumin from muscular tissue was employed. When the writers review their experience, they are not enthusiastic concerning the reliability of the method. They admit, however, that the technique is difficult and that the slightest variation or fault in it may result in vitiating the final return.

Practically the same results have been obtained by Goormaghtigh and Deheedler,¹ Djust,² Labbe and Petridis,³ Hyman,⁴ Loew,⁵ and Tuma.⁶ Tuma has found that iodide of potassium and fibrolysin may be used in trying the Abderhalden test. After giving as high as 30 gms. of potassium iodide, serum obtained from the brain of a puerperal patient gave a reaction as marked as placental tissue, but somewhat less pronounced than the substance of a kidney from a case of albuminuria. Fibrolysin was tested upon animals, ten injections (2 in 3 c.c.) being administered into the muscular tissue. Before the injection, the serum from animals gave a negative reaction with all the organs. After the injection the serum alone gave a feeble positive reaction, the strongest being obtained with material from the brain and kidney, while placental extract gave a less pronounced result. Fibrolysin alone and then placental and kidney substance were tried with negative result.

The Tuberculin Reaction in Pregnancy. Buchholz⁷ has studied cases of pregnancy complicated by tuberculosis in the clinic at Kiel. During a period of three months, all pregnant patients in the house were studied by the cutaneous and ophthalmic tests for tuberculosis. The cutaneous reaction was tested with 1, 25, and 100 per cent. old tuberculin. As a control, 0.5 per cent. carbolic acid was employed, which was also used in diluting the tuberculin. All of the pregnant cases were first subjected to physical examination, and in none of them was a florid tuberculosis found. One per cent. solution was employed in carrying out Erlandsen's method. The inoculation was with 1 per cent. solution, in comparison with 25 to 100 per cent. in acute tuberculosis. As no opportunity presented itself to investigate a case of acute tuberculosis, the writer did not go beyond the von Pirquet method with 25 to 100 per cent. tuberculin. By this method a positive reaction was obtained within twenty-four hours after inoculation. The areola usually seen after the von Pirquet test was not observed. The point of inoculation with 25 to 100 per cent. tuberculin did not react in the characteristic manner, but there were occasional cases where the 100 per cent. tuber-

¹ Progrès méd., 1915, 4220, p. 229

² Ibid., 1915, 4220, p. 8.

³ Urinal méd. de Paris, 1915, 34-14, S. 242.

⁴ Berl. klin. Wchnschr., 1915, 25, S. 301.

⁵ Biochem. Ztschr., 1915, Band lxi, Heft 1 and 2, S. 101.

⁶ Lekärske Rozhledy 21, 1915, No. 12.

⁷ Inaug. Diss., Braunschweig, Bieweg & Son.

culin gave a positive result. In the ophthalmic reaction, there was no severe inflammation and no prolonged influence. One hundred and thirteen pregnant patients were examined, varying from the seventh to the tenth months of gestation. In all, the von Pirquet test was made, while the ophthalmic reaction was obtained in 104. In 9, this reaction was omitted because of irritation of the conjunctiva. Of the von Pirquet cases, 25.4 per cent. gave a positive result, and, among these 17.5 per cent. had positive symptoms in the lungs, while 64.6 per cent. gave a negative reaction, of whom 12.3 per cent. had positive symptoms in the lungs. The average of positive reactions among those not pregnant varied from 63 to 67 per cent. So it is fair to conclude that, in pregnancy, the results are less positive. In 105 puerperal patients, 69.5 per cent. gave a positive test. When the results of the ophthalmic test are considered in pregnancy, 6.7 per cent. were positive; in the puerperal period, 13.6 per cent.

In pregnancy, the tuberculin reaction is less than in the non-pregnant; probably because there is a diminution in the formation of antibodies, which may explain to some degree the unfavorable influence of pregnancy upon tuberculosis. These results explain some of the negative reactions in pregnancy to tuberculin, for evidently in these cases the antibodies have not yet become exhausted. In cases of positive tubercular infection, if negative reaction occurs in pregnancy and persists during the puerperal period, the prognosis is distinctly bad, because it is evident that antibodies are not produced. When a negative reaction in the puerperal period follows a positive test during pregnancy, the indication is unfavorable. When the test is repeated in the most exact manner, during pregnancy, and gives a positive reaction followed by a negative reaction, the prognosis is distinctly unfavorable and, if the case is seen during the first half of pregnancy therapeutic abortion is indicated.

Local Skin Reactions to Ferment in Pregnancy. Kolmer and Williams¹ publish the results of experiments made with placental extracts to determine the cutaneous reaction to this substance during pregnancy. They found that placentins prepared by concentration of expressed placental juice preserved with glycerin and tricresol and injected intracutaneously, yielded skin eruptions characteristic of erythema infiltration and pain in 87 per cent. of pregnant and recently delivered women, and in 66 per cent. of women who had borne children. A slight reaction was obtained by this substance in 20 per cent. of the men thus examined. When diluted $\frac{1}{10}$ with normal salt solution, this extract gave 80 per cent. positive reactions among pregnant or recently delivered women, and 50 per cent. positive among women who had borne children.

¹ American Journal of Obstetrics, June, 1915.

A placentin prepared like the former, with the omission of glycerin, gave 40 per cent. positive reactions among pregnant or recently delivered women, and 14 per cent. among those who had borne children. A placentin made from the residue resulting from concentrating expressed placental juice gave 55 per cent. positive reactions among women pregnant or recently delivered. A glycerin extract of placenta produced by cutaneous inoculation gave 50 per cent. positive reactions among pregnant and puerperal women. Several multiparous and nulliparous women gave a negative reaction. Extracts of human male and female kidney gave a number of positive reactions, of which the most marked were observed with the extract of human female kidney. When 1 per cent. solution of placental peptone was injected beneath the skin, no reaction in these patients followed.

Bronfenbrenner, Freeland and Schlesinger¹ have found that the use of thimbles or dialyzing capsules of ninhydrin offers a series of errors in computing the results of the Abderhalden reaction. The writers are able to dispense with these by taking advantage of the formation of anaphylo-toxin resulting from the combination of specific serum with its corresponding substratum during incubation. To prepare this, the serum of the patient is injected intraperitoneally into a normal guinea-pig. Twenty-four hours later this animal is bled; its serum placed upon ice in a test-tube with a suitable quantity of substratum derived from placenta tuberculin or other tissue. Twelve to eighteen hours later the serum is centrifuged off and placed in the incubator for from twelve to eighteen hours. It then undergoes auto-digestion, and toxic split products of the serum are formed. At this time 0.35 c.c. of such serum is injected into the skin of the normal guinea-pig on the spot previously shaven. If the serum of the patient used in the test contains specific antibodies, a very distinct skin reaction is observed on the place of the injection.

The Significance of the Non-coagulable Nitrogen Coefficient of the Blood Serum in Pregnancy, and the Toxemias of Pregnancy. Plass² has made researches upon the non-coagulable nitrogen in pregnancy. He finds that this substance is a better index of kidney function than the total non-coagulable nitrogen alone. The coefficient is especially significant for this purpose. In the toxemias of pregnancy and eclampsia the non-coagulable nitrogen coefficient is of value in prognosticating the degree of permanent kidney change and in differentiating renal and hepatic toxemias. The comparative value of this test would be enhanced if it were applied to medical cases and its results compared with those obtained in obstetric practice.

¹ American Journal of Obstetrics, October, 1915

² Ibid., April, 1915.

The Diagnosis of Typhlitis Complicating Pregnancy. Jachske¹ describes the case of a primipara, aged twenty-six years, who, for two years, had attacks of irritation in the region of the appendix for which appendectomy was advised. This was declined or avoided by the patient until she had come to three weeks before the probable time for confinement. She was seen at the hospital because she had moderate fever, of which the cause was not evident. This fever subsided, to be followed by a higher rise of temperature and the patient returned again to the hospital. Upon admission, her temperature was 104° F.; pulse 104, of good tension and strong. The tongue was moist, but coated. There were no signs of labor and the patient did not feel distressed. There was slight tenderness over the region of the right kidney and over the appendix, but no other symptom. The urine contained leukocytes, and, as a natural consequence, albumin in considerable quantity. A diagnosis of pyelitis seemed probable, although the greater tenderness was in the region of the appendix. It was thought that appendicitis and possibly typhoid were present. Examination of the blood showed leukocytosis 17,000, and this seemed in favor of appendicitis. Two hours later the temperature was somewhat lower but the tenderness over the cecum more pronounced. At operation, as soon as the peritoneum was opened, thin pus escaped. When this ceased, a gauze drain was inserted, and, with a complete change of instruments and gloves, a vaginal Cesarean section was performed and a dead child delivered by version and extraction. After this operation was completed, the gauze drain was removed and the peritoneal incision prolonged and a considerable mass of purulent material found in the region of the right tube and ovary and the cecum. The appendix was thickened, edematous and congested, and constricted at the base, while its free extremity was adherent near the ovary. No perforation could be found. A portion of the cecum was edematous, grayish red in color, with a dark, dirty exudate, and on the posterior wall were small masses of purulent material. The free border of the ovary was covered with purulent material and the abdominal end of the Fallopian tube was swollen and reddened. It was found that a little pus had collected in Douglas's cul-de-sac, and this was carefully removed by gauze sponges. Drainage with strands of gauze was applied very thoroughly, the patient put in Fowler's position and saline solution introduced in small quantities into the rectum. One c.c. of pituglandol was given four times daily by injection into the muscles. Death from diffuse peritonitis occurred on the fourth day. Autopsy could not be obtained, but, in the pus which escaped, were found the colon bacillus and hemolytic streptococci. The appendix showed extensive infiltration, but no definite point of rupture. The most reasonable explanation for the case was a typhlitis whose point of origin could not be made out with absolute certainty.

¹ Zentralbl. f. Gynäk., 1915, No. 37.

Diagnosis During Pregnancy by Vaginal Examination. Ahlfeld¹ draws attention to the necessity for thorough and complete vaginal examinations to make an accurate diagnosis in pregnancy and beginning labor. If antiseptic precautions be employed thoroughly with the use of sterile gloves, so much of the hand as is necessary should be introduced and a completely satisfactory examination should be made. Schultze² draws attention to the necessity for thorough examination where there is delay in the beginning or in the course of labor. Unless the head is low in the pelvis, as many fingers as can be safely introduced should be employed in practicing palpation. Not only the engagement of the head, its condition of flexion or lack of flexion, and the presence or absence of descent and rotation, will thus be ascertained, but in addition the relation of the presenting part to the pelvis and any pelvic abnormality should be discovered. The child can be lost through prolapse of the short loop of the umbilical cord which may be occluded between the head and the pelvic brim. This condition would not be ascertained by a superficial and careless vaginal examination, in which possibly but one finger was introduced.

Measurement of the Pelvis by the Röntgen-ray. In the *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1915, Band xlii, Heft 4, Runge and Gruenhagen describe a method of pelvimetry by the Röntgen-ray, which they have found of especial value. They first determine accurately certain points in the pelvis by the use of the Röntgen-ray and apply to a further solution of the problem algebraic formulæ obtained by the examination and study of dried specimens from which they deduce the proportions and size of the pelvis under examination. By geometrical figures and equations, this method may give an accurate result.

The Diagnosis During Pregnancy of Uniovular or Duovulvar Twins. Ahlfeld³ calls attention to the fact that it is of practical importance to make the diagnosis of uniovular or duovular twins before labor. If the obstetrician recognizes the fact that a common placenta is present, which is the case with uniovular twins, the umbilical cord of the first born would receive a double ligature so that the circulation of the second child should not be disturbed because placental anastomosis may be present. The rule commonly pertaining in the conduct of labor cases, that the umbilical cord is to be ligated as nearly as convenient to the placental attachment, is useful even in this abnormality. Another diagnostic sign of considerable value is the occurrence of acute hydramnios developing rapidly during pregnancy, which indicates uniovular twins. Premature labor almost invariably results.

When, during the first stages of labor, immediately after the rupture

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

² Ibid., Band xlii, Heft 4.

³ Ibid., Band xli, Heft 2.

of the membranes, portions of two fetuses can be detected, the twins are probably of uniovular origin. An error in diagnosis may result when with duovular twins, both amniotic sacs present at the same time at the dilated cervix. When but one amniotic sac presents, one must remember that that of the second twin may already have ruptured. In uniovular twins, after the ligation of the first umbilical cord, there is a pulsation in the direction of the placenta, and, if the cord has not been ligated, blood may escape in small jets. One must refer this phenomenon to the heart beat of the second twin. If the question be asked under what circumstances duovular twins may be diagnosticated, during labor, the answer must be: When, after the birth of the first child, the second presenting in breech is found to be different in sex from the first.

When the second amniotic sac, still unruptured, consists of chorion and amnion, and this fact is recognized before the birth of the second child, one must assert that the twins are duovular. Ahlfeld narrates a case in which twin pregnancy was diagnosticated plainly by hearing heart sounds on both sides of the mother's abdomen. When labor came on, it was possible to remove a portion of the amniotic sac of the second child, and it was found to consist of chorion and amnion.

Excessive Thinness in the Wall of the Abdomen during Pregnancy Facilitating Diagnosis. Ahlfeld¹ calls attention to cases in which the abdominal wall of the pregnant woman became excessively thinned, so that one could actually see the intestine and make out, to some extent, the position occupied by the uterus. To do this the pregnant patient is put in such a position that a strong light is thrown upon the abdomen and, if possible, this should be a high light. The patient's position should be such that the observer can use his eyes from the most comfortable and convenient position. Where the abdominal wall is excessively thin and the recti separated, the warmed hands are placed on the abdomen one at the umbilicus and one below, and the thin abdominal wall is gently moved over the underlying organs.

Ahlfeld cites the case of a woman, aged twenty-eight years, in her fourth pregnancy, in whom the abdominal wall was exceedingly thin. By the method of examination described, he could make out the back of the child and could recognize the umbilical cord and its pulsation. It was seen to be once around the child's neck. On auscultation, one could appreciate a murmur in the cord. This observation was repeated on several occasions until pregnancy terminated in the birth of a living child. In a second case, pregnant for the second time, a portion of the uterus and also the tubes and ovaries could be made out. After the uterus was emptied, the abdominal wall still remained so thin that the round ligaments could be taken up and rolled between the fingers.

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

The Hygiene of Pregnancy; the Prevention of Mastitis. Strassmann¹ draws attention to the very common advice given to pregnant women that they shall harden the nipples by the local use of alcohol or brandy during pregnancy. He believes that this custom is a frequent cause of mastitis. Alcoholic substance is applied to the nipples with the finger or palmar surface of the hand, using cotton or even a brush and occasionally with a tooth brush! These various appliances are used so vigorously in some cases as to wound the tissues and produce a discharge of blood. The writer believes that mixtures containing alcohol are but little less injurious. It is true that these substances toughen the skin, but it is followed by many minute cracks and fissures which readily admit bacteria. Staphylococci are frequently found in the skin about the nipple and may thus readily gain access.

A second cause for mastitis is the application of water to the nipples during the puerperal period. The frequent use of water softens the epithelium and causes it to come away from the nipple. To avoid infection, it is also important that the breast be not disturbed indiscriminately by physician, nurse, and mother.

The Action of the Kidneys during Pregnancy. Holzbach¹ has studied the action of the kidneys during pregnancy in Sellheim's Clinic in Tübingen. In estimating the behavior of the kidney during pregnancy, he has found it valuable to ascertain the molecular concentration of the blood and the molecular concentration of the urine.

This is done principally by ascertaining the freezing point. To test the functional activity of the kidney, Albarran's method of experimental polyuria may prove useful. It is also valuable to estimate or ascertain by actual measurement the quantity of fluid discharged from the patient's body in each twenty-four hours. It is found that in some cases oliguria is present, the quantity of urine falling to half the normal. This may alternate with great increase. Rest in bed increases the quantity of urine secreted, and also the death of the child before the emptying of the uterus.

Büttner tests the comparative activity of the kidneys by allowing the patient to drink a liter of water, after which the quantity of urine, the freezing-point, and the percentage of chlorides are all taken. Some observers have found by this method that within five hours the kidney of the healthy non-pregnant patient would excrete water and soluble materials contained in it, while in cases of healthy pregnant women, much of this material would be retained. The fact that the function of the kidneys is so easily influenced by external conditions causes the quantity of urine secreted to vary greatly. The death of the fetus *in utero* causes at first a very considerable diminution in the quantity

¹ Zentralbl. f. Gynäk., 1915, No. 21.

² Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvii, Heft 1.

of urine, which then is followed by a marked increase. This may be present for a week or ten days before the expulsion of the dead child.

The effort was also made to test the secretion of urine during pregnancy by the injection of milk sugar in solution into the blood of the patient. It must be remembered that, during pregnancy, milk is actually forming in the breast, and that this contains milk sugar. This fact may explain the circumstance that, although milk sugar was injected in the blood in some cases, a greater quantity was found in the urine than the quantity injected. This can be accounted for by the secretion of milk containing milk sugar in the breasts during pregnancy. By comparison with the non-pregnant, it is found that the pregnant patient excretes far more sugar and more rapidly than does the non-pregnant. By comparative test, it was further found that milk sugar is excreted much more slowly by the kidney of pregnancy than by the kidney of the non-pregnant individual. The extent to which kidney insufficiency is present in pregnancy may be inferred from the fact that in 57 cases where the action of the kidney was studied during pregnancy, when these patients came into labor, 16 of the children were stillborn or died during labor. This exceeds 28 per cent. Baisch's statistics show that in 226 mothers, 21 per cent. of the children were stillborn and 19 per cent. were premature. In 55 per cent. of the mothers, some obstetric operation (usually the employment of the forceps) was necessary for their delivery. When the effort is made to trace the further condition and health of patients who showed diminished action of the kidney during pregnancy, it frequently happens that they are found with some permanent kidney lesion. It is estimated that but 40 per cent. of these women are really sound and healthy after pregnancy. It is interesting to observe that these cases were not those in which any kidney lesion or nephritis was diagnosticated during pregnancy, but that they were those of insufficient kidney action only without apparent lesion.

Under the title, "The Etiology of Chorea Gravidarum," Albrecht¹ calls attention to some of the theories which have been advanced to explain the development of chorea in pregnancy. Autointoxication is one of the most recent. The case is cited of a patient who, at the beginning of her first pregnancy, had symptoms of disturbance referred to the nervous system. There were abnormal sensations in the fingers, almost constant movement of the body, which at first affected the entire right arm, and these symptoms became worse at evening but abated somewhat during the night. The movements of the hands were so violent that no object could be retained in their grasp. These conditions disappeared after the birth of the child. In a subsequent pregnancy, the condition returned but with far more violence. This

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvi, Heft 3.

patient was at first treated by various drugs without result, when it was determined to try the injection of normal pregnancy serum. Twenty cubic centimeters was injected into the gluteal region followed by a very prompt cessation of symptoms and improvement on the part of the patient. Three weeks later there seemed a tendency to recurrence of the disease, but this passed by without an outbreak and the patient gained considerably in weight. These and similar observations would indicate that the chorea of pregnancy is the result of an intoxication. One must also recognize the fact that some variation from the normal hygiene of puberty, and the period just preceding it, may result in disturbance of those glands forming the internal secretions and the subsequent development of chorea. He describes the case of a girl, aged sixteen years, in whom menstruation had not been established. Five days after admission to the hospital, the first menstruation began and the patient's choreic manifestations became so violent that she had to be placed on a padded bed. She was fed with difficulty, and remained in an apathetic condition the greater part of the time. This condition persisted until the cessation of the period. Then ensued a period of quiet, a considerable gain in weight and the recovery of the patient. Our knowledge of the internal secretions is such that we recognize their existence as necessary for the successful establishment of menstruation. In the case of the patient in question, there had been delay and undoubtedly deficient action in these glands.

The Diagnostic Value of the Antitrypsin Method of Examining Blood Serum in Pregnancy. Chotzen¹ has found, by studying this subject, that the failure to increase in the antitrypsin elements of blood serum, as well as those cases where pregnancy is possibly present and also those of malignant disease, has a negative bearing upon the question of diagnosis. A positive antitrypsin reaction, taken in connection with other symptoms, and especially if the Abderhalden test be positive, points strongly to the diagnosis of pregnancy. According to the writer, the most rational explanation of this phenomenon is the formation of antiferment, and this is part of a general process for the protection of the body.

In *PROGRESSIVE MEDICINE*, 1915, p. 139, the reader will find Adachi's method for the use of antitrypsin in the diagnosis of pregnancy. His studies were carried out in Franz's Clinic in Berlin, and he² describes in detail the technique of his method. His results, on the whole, were favorable to the test.

The Prevention of Puerperal Sepsis by Vaginal Injections of Lactic Acid during Pregnancy. In *PROGRESSIVE MEDICINE*, September, 1915, p. 146, Schweitzer³ gives a favorable result for the prophylactic use of lactic acid

¹ *Ztschr. f. Geburtsh. u. Gynäk.*, 1915, Band lxxvi, Heft 3.

² *Ibid.*, Heft 2.

³ *Zentralbl. f. Gynäk.*, 1914, No. 9.

by vaginal injection during pregnancy. While it could not be definitely asserted that the mortality was lessened, morbidity was made much less.

Thaler and Zuckermann¹ have employed vaginal injections of 5 per cent. lactic acid to lessen the growth and activity of bacteria in the vagina during pregnancy. They review the literature of the subject, drawing attention to Schweitzer's paper, and examined and treated 153 patients, both primiparæ and multiparæ in the last months of pregnancy. In 73 cases (47.7 per cent.) bacteriological examination of the vaginal secretion showed it to be abnormal. These patients received the injections. They were not examined vaginally after the treatment began until labor developed, but each received daily a vaginal irrigation with 1 liter of sterile 5 per cent. lactic acid solution. The usual examinations under antiseptic precautions were made during labor. In 46 of these cases, the number of douches given were from 14 to 24, or on the average—18. Twenty-four hours after the last injection the vaginal secretion was again examined bacteriologically. In some cases, an examination was made still later to ascertain how long the influence of the method of treatment persisted. Twenty-seven of these patients with pathological secretion came into labor somewhat before the time, so that they received less than ten irrigations. When the results of the treatment were determined by bacteriological examination, it was found that of 46 patients with pathological secretion, 37 of whom averaged 17 irrigations, or 80.4 per cent., a typical healthy vaginal secretion had taken the place of the pathological condition at first present. In a number of cases, in addition to this, the bacteria had disappeared, although occasionally it was found that some still remained. So far as streptococci were concerned, in 10 cases they had been present, and in 4, averaging 19 irrigations, each, they were found to have disappeared after the treatment. The writers believe that the treatment should be continued for at least two or three weeks daily, and, in fact, should be continued for the month preceding labor as regularly and persistently as possible. When the effect of the treatment upon temperature was considered, 80 pregnant patients with normal secretion were observed, in whom the irrigations were not employed. These patients were examined in the customary manner during labor and in 7 cases the axillary temperature rose sufficiently above normal to be considered as pathological. In 27 cases receiving a few irrigations, there was rise of temperature in 6, a mild infection occurring after spontaneous labor. All of these patients recovered. In 2 of those having temperature during the puerperal period, a pure culture of hemolytic streptococci had been detected. One of these patients showed, during the puerperal period, a pure culture of hemolytic streptococci in the lochial secretion. In the third case, having strepto-

¹ Monatschr. f. Geburtsh. u. Gynäk., 1915, Band xlii, Heft 1.

cocci, the irrigations were not successful in destroying the germ. These patients, however, had no fever after delivery. When the puerperal period is studied, in those patients having irrigations for two or three weeks, it was observed that there was a rise of temperature four times. This very much resembles the history of those patients having normal secretion and no irrigations. Labor was spontaneous in these cases and the disturbance through rise in temperature was very slight. No patient in whom streptococci had disappeared under repeated injections had moderate fever during the puerperal period. Bacteriological examination of the secretion showed chains of staphylococci and bacterium coli. If the question is raised as to how the lactic acid solution produces its effect, a satisfactory answer is not forthcoming. It is thought that the vaginal secretion in pregnancy is of acid reaction in healthy patients, and that the non-pathogenic bacteria found at this time have a distinct function in maintaining this condition. Bacteriologically, the observation is made, which has long been familiar clinically, that those patients who are constitutionally weak suffer most from disordered vaginal secretion. There seems to be then some connection between the two. A point of some practical interest is the length of time during which the effect of this method of treatment remains efficient. Here again the constitutional condition of the patient plays a part.

There seems to be no reason to doubt the statements made in this paper and that of Schweitzer, and, unquestionably, in a clinic where bacteriological examinations can be made accurately and frequently, and where antiseptics is perfectly carried out, this method may be of some practical value. It is interesting to observe that the most that can be claimed for it is that it lessens puerperal morbidity without apparently influencing to any great extent puerperal mortality.

The Function of the Liver during Pregnancy. In the *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1915, Band xliii, Bauch gives the results of his observations in testing the function of the liver in 22 pregnant patients by the administration of 40 gms. of galactose. The urine was then examined to ascertain the excretion of this substance. In 8 (or 37 per cent.) from 0.4 to 1.8 gm. was found. This, however, must not be thought pathological, for lactic acid is present in considerable quantity in pregnant women. During pregnancy, it is probable that sugar increases in the blood, and Bauch observed one patient who suffered from a mild toxemia and who had an increase in the quantity of sugar in the blood which became very much greater when galactose was administered.

The Influence of Adrenalin upon the Blood Conditions Existing in Pregnancy. Aymerich,¹ in Ferroni's Clinic in Parma, has made observations to determine the influence of adrenalin on the condition of the blood in

¹ Annali di Ostetricia e Ginecologia, 1915, No. 5.

pregnancy. He finds that the use of this substance produces an increase in the erythrocytes, while the hemoglobin is somewhat lessened. In cases complicated by albuminuria and severe anemia, adrenalin does not seem to have much influence, nor has it in the puerperal period. The eosinophile cells are usually diminished, the older forms of leukocytes varying considerably, the splenic function in the production of blood corpuscles does not seem to be altered; the nervous system, especially the sympathetic, is somewhat stimulated by this substance.

The Duration of Pregnancy. Schultz¹ raises several questions concerning our knowledge of the duration of pregnancy. He first asks what we really know and in what our knowledge is lacking concerning the normal duration of pregnancy. In answering this question, he states that the normal end of pregnancy is the birth of a fully developed child. We have no direct observation on this criterion to state when a pregnancy so terminating actually began. We ordinarily take the history of the mother concerning the last period, and we take the average occurrence of amenorrhea during pregnancy as practically the rule. Our study of the corpus luteum and its function bids fair to throw a new light on this problem. The much-discussed question as to whether pregnancy has resulted from the fertilization of an ovum just before or after a period seems best solved by considering that the birth of a full-term child occurs on the average of two hundred and eighty days, and usually after a period. If there is reason to believe that impregnation occurred during the period between menstruations, then nineteen days should be taken from the two hundred and eighty, making two hundred and sixty-one days from the time of the last period. It is well known that at least one menstruation may occur after pregnancy has begun. He further asks to what extent one is able to predict the time at which a pregnancy will end. In this he believes that we have gained nothing by recent researches and that we must rely largely upon palpation and clinical observation.

His third interrogation asks what landmarks or what characteristics one shall take into account in endeavoring to estimate the length and period of pregnancy. Further—what shall we make as the earliest limit of viability? Taking two hundred and eighty days as the average, he would admit viability in from thirteen to nineteen days before that.

In the *American Journal of Obstetrics*, June, 1915, Robertson gives the results of an investigation to determine the normal period of gestation in man. Much of the data which are employed were from a maternity hospital in Adelaide, South Australia. He found, from a statistical investigation of 511 normal confinements in South Australian women, comprising 247 confinements yielding male infants and 264 yielding female infants, that the mean length of time of gestations

¹ Zentralbl. f. Gynäk., 1915, No. 28.

yielding male is 282.5 days with a probable error of 0.55 days. The mean length of gestations yielding females is 284.5 days, with a possible error of 0.57 days. There is but one period—the normal period at which the percentage of infants delivered by normal mothers attains a maximum. Subsequently to a very early period in the development of the fetus, a deviation of normal periods of gestation is entirely a matter of accident, so far as we know. The chances are a million to one against a male child being delivered at the termination of an otherwise normal pregnancy before two hundred and twenty-four days, or of a female child before two hundred and twenty-two days after the beginning of the last menstruation. Hence all seven months children must be regarded as the fruit of pathological pregnancies. The length of the period of gestation is very much less variable in normal females than the weight of the infant which is delivered. From this it may be inferred that the length of the period of gestation in normal females is primarily determined not by the fetal development, but by a cycle of events in the mother which is, to a considerable extent, independent of the fetal development.

The Pulse during Pregnancy. Bigler¹ publishes an illustrated paper giving the results of investigations in the character of the pulse of the parturient woman. He finds, by the use of apparatus, that the falling of the peripheral pulse at the end of pregnancy is less than the normal. So also is the energy or force of the pulse and its tension. The cause of this phenomenon is probably the fact that the quantity of blood which is required in pregnancy to supply the genital organs and especially the pregnant uterus near term is necessarily taken from the periphery. This does not militate against the commonly accepted belief that the actual work of the heart is increased during pregnancy. We have, however, no way of measuring the amount of work required from the heart in supplying the pregnant uterus with its necessary blood.

It may be that the lack of peripheral fullness and tension is in compensation for the blood which the heart must send to the gravid womb. The clinical fact that the combination of pregnancy and valvular heart disease is very rarely accompanied by phenomena of autocompensation favors this hypothesis. During labor, the heart increases the peripheral circulation considerably, and this reaches its climax during the period of actual expulsion. This increase in the peripheral pulse is but a factor in the total work done, for the increase in the filling of the peripheral pulse during labor stands in no relation to the actual work imposed upon the heart. On the whole, labor must throw upon the heart a very considerable strain.

The marked sinking in the peripheral filling of the pulse and in its strength and tension which is observed after labor may be principally

¹ *Ztschr. f. Geburtsh. u. Gynäk.*, 1915, Band lxxvii, Heft 2.

referred to the distention of the blood channels under the influence of the splanchnic nerves. During the puerperal period, the conditions are all favorable for a slow, and often not very strong, pulse. The dynamic tracings written during the puerperal period give a pulse of plateau form which has been by some described as an insufficient pulse and which is characterized by the fact that the artery is not completely filled.

Arterial Tension in Pregnancy. Pellissier,¹ in Bar's Clinic in Paris, has examined women suffering from heart lesions and semi-altered conditions of the blood to determine the arterial tension. He finds that when these lesions are at the mitral orifice the diseased condition of the heart muscle is indicated in general in a very significant manner by the irregularity of the curve of pulse tension rather than by the distance between the highest and lowest points. When the viscosity of the blood is increased, it frequently produces disturbance of the lesser circulation. As a rule, in the pernicious nausea of early pregnancy, there is a diminution in the tension, and, when the viscosity of the blood is markedly increased, one must fear that a grave lesion is developing and institute active treatment.

Pelvimetry at the Pelvic Outlet. Pierce² describes the measurement of the pelvis at the outlet by an instrument which he has devised and used for this purpose. It consists of a long bar having a pelvic curve and about the shape of a male sound. This is graduated and has a short cross bar with binding screw as an index. The diameters measured are the tubero-ischial transverse, the posterior sagittal and the antero-posterior. The first is measured between the lowest inner margins of the tuberosities of the ischia. The antero-posterior is measured from the sub-pubic region within the vagina to the tip of the sacrum, posteriorly, deducting 1 c.c. of the thickness of the sacral tip. The posterior sagittal cannot be directly measured, but may be approximated by carrying the tip of the pelvimeter back over the tissues of the tip of the sacrum posteriorly and subtracting 1 cm. to allow for the thickness of the tip. Without a fixed transverse base line, this measurement cannot be taken. The average measurement of the transverse diameter at the outlet is 10.5 cm.; the antero-sagittal 5 cm.; the posterior sagittal 7.5 cm.; the antero-posterior 11.5 cm. The paper is well illustrated and contains minute directions for the use of the instrument.

Tumors Complicating Pregnancy. Cullen³ describes the case of a negress, aged thirty-three years, with a practically negative early history and the statement that ten years after marriage she had an instrumental labor and was much torn. This was followed by high

¹ Archives mensuelles d'Obstétrique et de Gynecologie, May, 1915.

² American Journal of Obstetrics, October, 1915.

³ Surgery, Gynecology and Obstetrics, March, 1915.

fever, vomiting, and abdominal pain. Menstruation became abnormally frequent, and the patient suffered in consequence. For the last five years, she had had pain in the right lower abdomen, usually dull and sometimes accompanied by nausea. There had been no chills, fever, nor vomiting; the abdominal discomfort is not always present, but is aggravated by exertion. Three years ago the patient was supposed to be pregnant, and had the usual symptoms and perceived fetal movements. She had, on one occasion, severe abdominal pain like labor, which lasted five minutes then suddenly ceased, with a discharge of blood from the vagina. Immediately afterward, the patient noticed a hard, tender lump in the right lower abdomen. This has grown smaller and the abnormal enlargement as well. There had been no especial loss in strength; no swelling of the feet, but dyspnea on exertion, cough, night sweats, indigestion without jaundice. Micturition was abnormally frequent, the urine sometimes being mixed with blood. There was a vaginal discharge, profuse, odorless, and irritating.

Upon admission to hospital, there was an irregular nodular mass on the right side of the abdomen, giving a peculiar crepitus on palpation. Upon vaginal examination, the cervix was firm, the uterus slightly enlarged and retroposed. On the right side of the pelvis was a mass apparently connected with the uterus. From history and examination, the case was thought to be abdominal pregnancy. The patient was catheterized under ether, and a large quantity of thick, tenacious urine obtained, and in the bladder the catheter came upon something which felt like a stone.

At operation, the mass was adherent to the omentum which was ligated and severed. The bowels, which were adherent, were separated as carefully as possible, but torn near the ileocecal region and immediately repaired. When the sac was opened, it contained a large number of fetal bones. The attempt was then made to enucleate the sac, and the left tube and ovary were removed. The bladder was adherent and one of the long bones projected into the bladder, the portion within the bladder being covered with urinary salts. The bone was removed from the bladder; the opening closed with catgut, and the sac was finally completely delivered from the abdomen. The appendix was thickened and was removed, and the hole in the cecum closed. Another opening which had been made by a bone, was also closed and a parovarian cyst removed from the right side. Cigarette drains were carried into the cecal region and into Douglas's cul-de-sac. The patient gradually recovered, the bladder becoming normal and the urine perfectly normal.

Ovarian Tumors in Pregnancy. Danforth¹ describes the case of a woman, aged thirty-two years, pregnant about three months, who had an ovarian tumor about the size of a fetal head, complicating a three-

¹ Surgery, Gynecology and Obstetrics, March, 1915.

months' pregnancy. At operation, the tumor was an elongated sphere, firm, hard, and white, and covered by a firm glistening thin capsule. Microscopic examination showed it to be a fibromyoma which has undergone myomatous degeneration. The patient made an excellent recovery and has not since been heard of. As the pregnancy was her third and the preceding labors had been normal, it is inferred that she had a spontaneous delivery.

Solid tumors of the ovary are not of frequent occurrence, and ovarian tumors complicating pregnancy are said to occur in 17,832 deliveries twenty times, according to Fehling; while Loehlein found 2 cases in 13,000 pregnancies. A thorough search through the literature, made by Swan, in 1898, found but 14 undoubted cases of solid ovarian tumors complicating pregnancy. McKerron, in his well-known paper, collected but 19 cases of solid ovarian tumors out of 862 in which the character of the tumor was known with reasonable certainty. Dermoids are the most common variety of ovarian tumor complicating pregnancy. The frequency of the solid tumor may be given as varying from 2 to 6 per cent.

The accident most often observed, in ovarian tumor complicating pregnancy, is torsion of the pedicle of the tumor. This occurs three times as often as in ovarian tumors where pregnancy is absent, and is probably present as a complication in 1 out of 8 cases. It is especially frequent when the tumor is in the abdomen and not in the pelvis.

The uterus may also become twisted to 180 degrees in extreme cases. Should the circulation of the uterus be greatly disturbed, abortion may result. When the tumor is excessive in size, pressure may cause the uterus to discharge its contents at any period of pregnancy.

In diagnosis, it is practically impossible to ascertain with certainty the character of an ovarian tumor. When palpation is readily performed, an ovarian tumor of moderate size may easily be recognized, but, if the tumor has become adherent or is solid and liquid in its content, it may simulate pelvic exudate or pelvic abscess and a positive diagnosis may become difficult. The closer the tumor is adherent to the uterus, the more difficult may be the differential diagnosis.

An ovarian tumor which has fallen into Douglas's cul-de-sac may very closely simulate a retroflexed pregnant uterus. A diagnosis may be made by carefully observing the direction in which the cervix points. If the uterus is retroflexed, this will be far upward, while if the tumor be present, the cervix will point as usual downward and backward.

In rare cases, a dislocated and floating kidney descending into the pelvis or at the brim may simulate an ovarian tumor complicating pregnancy.

So far as prognosis is concerned, the sooner the tumor is removed after its presence is recognized, the better for the patient. Torsion of the pedicle is to be feared, and this accident is serious in direct propor-

tion to the time elapsing after torsion occurs before operation is performed. The situation of the tumor is of importance in the matter of prognosis and an intrapelvic tumor is always a serious complication.

Rupture of an ovarian cyst during pregnancy is also a serious complication, especially as many ovarian cysts suppurate during gestation. Should this accident be diagnosticated, the immediate removal of the cyst followed by drainage is indicated. Twisting of the pedicle, rupture, suppuration, or rupture and suppuration may be expected in about 1 to every 4 cases and at any period of gestation. Thus, an ovarian tumor complicating pregnancy is a menace during its whole existence.

So far as treatment is concerned, operation was considered a last resort until comparatively recent years. In 720 of McKerron's cases, the tumor was allowed to remain undisturbed until labor. Of these, 152 women died and this mortality would have been greater still had not operation been done during the labor or immediately afterward. Thirty per cent. of the children were lost. The writer inclines to operation as soon as the diagnosis is made, and in the presence of complications arising from the tumor, immediate operation is imperative.

The percentage of abortions following the removal of an ovarian tumor complicating pregnancy, seems to depend somewhat upon the variety of operation. The reviewer, in papers previously published, found that where the tumor was removed by vaginal section, that abortion occurred in 49 per cent. of the cases, whereas after abdominal section, Flattau observed abortion in but 17 per cent. and Wähler in 22 per cent.

The mortality of pregnant women having ovarian tumors, if they receive intelligent treatment, is not much greater than that of non-pregnant patients having these tumors. Thus, from 2 to 5 per cent. mortality from ovarian tumors in pregnancy is given by various observers. These cases were treated by operation, and the results contrasted strongly with 21 per cent. mortality given by McKerron in patients who had no operation.

When the tumor remains unrecognized until the last months of pregnancy, many believe that its removal should be immediately followed by Cesarean delivery. Good results are obtained by this method.

When the case is not seen until the woman is in labor, if the patient had not been infected, it may be possible to push the tumor up out of the pelvis and accomplish delivery through the vagina. The tumor may then be removed as soon after labor as is thought best.

When the tumor cannot be replaced, it may be punctured or incised and drained, if it be cystic, after which delivery should be accomplished as speedily as possible. The sac of the tumor should be removed by abdominal incision or vaginal incision within twenty-four hours. With the patient in a well-conducted hospital, the tumor may be removed by abdominal section followed by Cesarean section or delivery through

the vagina. Unquestionably, delivery by Cesarean section is safer and less apt to be followed by hemorrhage. In the reviewer's experience, an ovarian tumor in Douglas's cul-de-sac may be mistaken for a retroflexed gravid uterus and reposition of the supposed uterus may be attempted. On one occasion, the reviewer was consulted by a patient, on whom he had previously performed Cesarean section, and who found herself again pregnant. She had not been under the reviewer's observation for sometime, but had suffered from backache and disability and had consulted an expert gynecologist, who diagnosed pregnancy with retroflexed uterus and inserted a pessary with which he hoped to replace the womb. As this was not successful but increased the patient's distress, she came for further advice. Upon examination, it was not difficult to make out the fundus of the pregnant uterus just at the pelvic brim and also a semi-solid mass in Douglas's cul-de-sac. Upon operation, a cystic and solid ovarian tumor was found so large as to completely fill Douglas's cul-de-sac. It was brought up out of the pelvis with some difficulty. It was removed and its pedicle carefully ligated and covered with peritoneum. Pregnancy was uninterrupted and the patient made a good recovery from the ovariectomy.

ATYPICAL CHORIOEPITHELIOMA. McClellan¹ reports the case of a multipara, previously having good general health, who had a premature labor at seven months, followed by general weakness and persistent anemia. Menstruation finally ceased, followed by abortion at three months, and, the day following the abortion, there was a severe chill followed by high fever and profuse perspiration and the next day the lochia was so profuse and offensive that curetting was performed, the scrapings not being examined microscopically. Temporary improvement was followed by the patient becoming rapidly worse.

Upon admission to the hospital, there was extreme weakness, pallor, feeble rapid pulse, air hunger, hemoglobin less than 40 per cent. From the uterus came a discharge pale in color and offensive in odor. The womb was large, the cervix open, and a soft spongy mass within the uterus. Upon removal, this resembled an old blood clot undergoing putrefaction. On microscopic examination, many syncytial cells were present. To check the hemorrhage, the uterus was thoroughly packed with iodoform gauze and tonics were prescribed. Gradual improvement followed until sharp pain in the left chest, with coughing and bloody and offensive expectoration, developed. Upon microscopic examination, the sputum contained cells identical with those originally obtained from the uterus. Enlargement of the liver and spleen followed, and the patient's condition became desperate. She gradually rallied, however, the hemoglobin soon reached 80 per cent. and the patient made a complete recovery. She has been convalescent sufficiently long

¹ American Journal of Obstetrics, December, 1915.

to give every hope that she has permanently escaped malignant disease. This extraordinary case closely resembles one under the observation of the reviewer, which was complicated by streptococcus infection. A patient, pregnant a few months and aborting, infected herself by making upon herself a vaginal examination to ascertain the progress of the abortion. The uterus was at once emptied with the curette and packed, and, as the tissue removed was typical of an early ovum, no further examination was made. The patient, however, became exceedingly ill, with intense anemia, chills, and fever, although an examination of the blood failed to find hemolytic streptococci. The cervix uteri remained partially opened and an offensive discharge persisted. The patient was transferred to the seashore, and, under the vigorous use of tonics and forced feeding, gradually made a complete recovery. The most probable explanation for her condition was choreo-epithelioma from which she recovered.

In view of our present knowledge concerning the syncytium and its abundant proliferation in every pregnancy, we must believe that choreo-epithelioma is not so rare as we formerly supposed. Many cases of offensive discharge or hemorrhage after abortion must be ascribed to this cause, and recovery must occur more frequently than we have imagined. Such cases emphasize the necessity for the thorough treatment of abortion, and it is the reviewer's belief that all cases of abortion should be treated as soon as possible by the use of the curette and thorough packing with 10 per cent. iodoform gauze, which should be done under an anesthetic in ordinary cases. By this treatment the syncytium is discharged more completely than if the patient does not receive this attention. Hemorrhage is prevented, drainage is promoted, and the recovery of the patient is much more probable.

FIBROID TUMOR COMPLETELY OBSTRUCTING THE UTERINE CANAL, WITH LONG RETENTION OF A DEAD FETUS. Pfaff¹ reports a case of a negro woman, aged thirty-five years, multipara, with indefinite history, who complained of pelvic soreness and backache. Examination showed a uterine tumor, with two large masses. Supravaginal hysterectomy was performed, leaving the left tube and ovary.

Upon examining the specimen, it consisted of the fundus of the uterus with the right tube and ovary. The uterine mass presented two tumors. The upper one, when palpated, resembled parchment and seemed to be calcareous. When the lower tumor was incised, it was found to be a large submucous fibroid bulging into the cavity of the uterus. A small crepitant tumor above was the skull of a partially macerated fetus attached by the cord to the remains of the placenta. There was no amniotic fluid, the brain had been reduced to a grumous material.

¹ American Journal of Obstetrics, December, 1915.

The pregnancy had evidently been interrupted many months before the operation, and the appearance of the fetal cranial bones indicated that they might have been detained for an indefinite time. The patient made an uncomplicated recovery.

Hartog¹ reports the case of a patient in her fifth pregnancy admitted to hospital after being in labor for three days. A dead child was immediately delivered through the vagina. There was profuse hemorrhage, and, on introducing the hand to remove the placenta, a tumor as large as a child's head was found inserted at the upper cervical segment. The placenta was reached with difficulty alongside the tumor. The uterus contracted, but hemorrhage became alarming and the tumor was enucleated. Hemorrhage ceased, the patient was stimulated, and improved, but one hour later hemorrhage reappeared and became fatal.

Zangemeister² had a case in which a myoma the size of a large fist blocked the pelvis of a primipara, aged thirty years. A Cesarean section was performed, with the birth of a living child. The uterus was so distended that rupture was threatened and supravaginal amputation was done, with the detachment of the myoma. The amniotic liquid in the uterine cavity had undergone decomposition and was gaseous and purulent. Microscopic examination showed the presence of the colon bacillus and streptococcus. The patient made an uninterrupted recovery.

Fuchs³ performed a Porro operation upon a primipara, aged forty years, for a myoma obstructing delivery. Uncomplicated recovery for mother and child followed. This case is interesting because the tumor grew so rapidly during six months of pregnancy that it reached three times its original size. The tumor was upon the anterior uterine wall, which caused extreme bulging in the posterior wall. The tumor grew downward into the pelvis until it became firmly wedged in, the fetus lying transversely at the pelvic inlet.

In Carmichael's⁴ case, a primipara, aged forty-two years, had a myoma the size of an apple removed from the uterine fundus by abdominal section. The patient was five months pregnant and suffered severe pain. A large myoma was also found in the cervix, but was not disturbed, and pregnancy went on to term. Cesarean section was then performed, followed by hysterectomy, and living twins were born.

Volmat⁵ reports the case of a primipara, aged forty-three years, having a large myoma solidly wedged in the pelvic inlet. The child lay

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1909, Band xxix, p. 431.

² Ibid., 1908, Band xxvii, 402.

³ Ibid., 1911, Band xxxiii, Heft 229.

⁴ Journal of Obstetrics and Gynecology, British Empire, 1913, vol. xxiv, No. 2, p. 124.

⁵ Bull. de la Soc. d'Obst. et Gyn. de Paris, 1915.

above in transverse position. Pregnancy was allowed to go on, but labor did not develop and elective section was done, followed by hysterectomy. The result was satisfactory for mother and child.

Fothergill¹ performed Cesarean section upon a patient in whom labor was made impossible by a fibroma on the anterior wall of the uterus, blocking the pelvis. The operation was completely successful. Hendon² operated upon a woman by abdominal section and enucleated a fibroid tumor. He then discovered a four months' pregnancy. Abortion resulted in twenty-four hours, the case ending in recovery. Schrenck³ observed a pregnancy complicated by two subserous myomata the size of a fist. The patient was delivered at term by forceps and had secondary hemorrhage, but made a good recovery.

The Combined Operation for the Interruption of Pregnancy and Sterilization. Findley⁴ reports 4 cases in which he performed the operation of interrupting pregnancy followed by sterilization. This method has been brought to our attention by Sellheim,⁵ Anderes, and others. The results in Findley's cases were good.

He operates by first giving 1 c.c. of pituitin hyperdermatically five minutes before the abdomen is opened. The uterus is incised across the fundus from tube to tube. The ovum is enucleated with the fingers and the entire uterine cavity inspected. The uterine incision is then closed by a double row of catgut sutures. Each tube is ligated and resected and the cut end covered by the layers of the broad ligament.

There is no question concerning the efficiency of this operation. The ovaries remain and the patient is spared the immediate disturbance of a menopause. Probably some time is gained and disturbance avoided by not removing the body of the uterus. In the observation of the reviewer, however, he believes that in cases in which a reasonable time may be taken, it is much better to remove the tubes and the body of the uterus without delaying to remove the ovum. A better closure can be made by covering the cervical stump with peritoneum, and the patient is spared the risk of the development of disease in the uterine body.

At a meeting of the New York Obstetrical Society, October 12, 1915, Brown⁶ reported a primipara in early pregnancy who suffered from pain in the right lower abdomen. Upon examination, there was shock, with slight rise of temperature; the abdomen was distended, and very painful to the touch in the right lower quadrant. Upon bimanual examination, there seemed to be a cyst posterior to the uterus which filled up the cul-de-sac, and a tumor could also be felt projecting above the pubes. The

¹ British Medical Journal, November 8, 1913, p. 1230.

² American Journal of Surgery, 1913, vol. xi, p. 429.

³ Deutsch. med. Wchnschr., 1913, p. 1525.

⁴ American Journal of Obstetrics, December, 1915.

⁵ Monatsschr. f. Geburtsh. u. Gynäk., 1914, Band xxxviii, Heft 2.

⁶ American Journal of Obstetrics, December, 1915.

uterus could not be definitely made out. On operation, a dense ovarian cyst was found and a second cyst posterior to the uterus. Both tumors and tubes and the appendix were removed, the patient making an uninterrupted recovery without the loss of the pregnancy. At the time when the case was reported, the pregnancy was five months successfully advanced. No ovarian tissue could be found in the tumors or the tubes, and pathological examination showed sebaceous material, hair, cartilage, bone, and epidermis.

In the discussion of this paper, the interesting point was brought up as to whether the removal of both ovaries during pregnancy would inevitably be followed by abortion. Cases were reported by Studdiford, Frank, and others, showing that it is possible to remove both ovaries or tumors which have replaced them during pregnancy and still have the pregnancy go on to successful termination.

At the same meeting, Brodhead reported the case of a patient upon whom, two years previously, he had performed Cesarean section, followed by the removal of both large multilocular cystic ovaries. Uneventful recovery followed and the patient was informed that subsequent conception was scarcely possible. Menstruation, however, returned, followed by pregnancy, and a second Cesarean section was performed, accompanied by sterilization. This case illustrates how small a quantity of ovarian tissue is necessary for the occurrence of pregnancy.

Nephrectomy during Pregnancy. Schmidt¹ had a multipara with renal infection with the colon bacillus and bacillus tuberculosis. The left kidney, by palpation, was enlarged and sensitive. Pregnancy was about the end of the fifth month. Through the usual incision, the kidney was removed, with ligature of the vessels and ureter, and the wound closed with drainage at both ends of the incision. The patient made a slow recovery and the incision did not completely close until after the birth of the child. Labor was normal, the baby dying of septic infection when twelve days old. Upon examination, the kidney was found tuberculous, with inflammation of the pelvis and ureter.

The writer has collected 35 cases, 5.7 per cent. representing the maternal mortality. The majority of these patients (77 per cent.) had normal labor, at term. The fetus suffered from the operation in 15 per cent. There were three abortions, 1 therapeutic abortion, induced labor once, and the birth of a stillborn child by extraction. Most of the cases were during the fourth month of pregnancy; next in frequency came the fifth and sixth; the rest of the duration of pregnancy had about an equal number of cases.

It is especially necessary, after nephrectomy, in pregnancy to watch the function of the remaining kidney. Should the quantity of urine immediately diminish markedly, the uterus must be promptly emptied.

¹ Surgery, Gynecology and Obstetrics, December, 1915.

That the removal of one kidney in no way makes pregnancy and childbirth impossible, even under grave complications, is shown by a case coming under the observation of the reviewer. The patient had lost a kidney by nephrectomy for tubercular infection sometime before. Her subsequent pregnancy was complicated by eclampsia, from which she recovered with the birth of a dead child. Her recovery, so far as could be observed, was complete, the urine being normal in quantity and composition when the patient was discharged from the hospital. She was treated during the eclamptic period by vigorous elimination, bleeding, with transfusion, and thorough purgation and lavage of the stomach. The membranes were prematurely ruptured and labor allowed to develop spontaneously.

Harrigan¹ reports the case of a patient about four months pregnant, who had an alveolar abscess, which ruptured spontaneously. Two days afterward she had severe pain in the lower back, with chill and fever, increase in pain, finally localizing in the right lumbar region and the right side of the abdomen. Upon physical examination, there was indefinite resistance in the right side of the abdomen, with great tenderness. The uterus extended almost to the umbilicus. The urine contained albumin, leukocytes, granular, and large hyaline casts. In the blood, the leukocytes were 34,800. The patient was thought to have a unilateral hematogenous infection of the kidney following the alveolar abscess. At operation, the kidney was removed for multiple septic infarcts, the patient making an uncomplicated recovery. At seven and a half months, the patient became toxic, with slight jaundice; labor was induced and a well-developed child was born within twenty-four hours. Two years afterward, the patient was in excellent health. Upon examining the kidney, suppurative nephritis, with multiple foci of infection, was present.

A review of the literature reveals 36 additional cases of nephrectomy during pregnancy. In 30 the result is stated (28 recoveries and 2 deaths). In 24 cases, the obstetrical history is given (20 having spontaneous labor; 2 spontaneous abortion, and 2 therapeutic abortion). The 36 cases are briefly reported and the references given.

The reviewer, in several papers, has called attention to the necessity for prompt diagnosis in colon bacillus infection of the kidney complicating pregnancy. He has advocated, and practiced successfully, drainage of the kidney by cutting down upon it, stitching the capsule to the wound, incising the kidney, passing the finger to the pelvis and introducing a strand of gauze or cigarette drain. This is gradually removed and resulting fistula allowed to close. In the reviewer's observations, pregnancy was uninterrupted and the colon infection subsided. It is believed that by this means nephrectomy may be avoided, the patient

¹ Surgery, Gynecology and Obstetrics, June, 1915.

spared the loss of the kidney, and, further, that the kidney anchored in its normal position will relieve the patient of the possibility of the development of floating kidney. Some of the cases upon which the reviewer operated were done several years ago and the permanent result has been good.

The Toxemia of Pregnancy. EXPERIMENTS TO DETERMINE THE ACTIVITY OF DISEASED KIDNEYS DURING PREGNANCY, WITH ESPECIAL REGARD TO THE INTERRUPTION OF PREGNANCY. Orlovius¹ has conducted experiments to determine the eliminating power of the kidney during various complications in pregnancy. His clinical material embraced 3 non-pregnant patients; 10 pregnant patients without abnormal conditions of the kidney, and 5 in whom the kidneys were in a pathological condition.

His method consisted in the administration of creatinin in quantity of 1.5 gms. to 200 c.c. of sweetened water, given by mouth shortly before the beginning of the day on which the observations were made. The quantity of urine excreted in the forenoon of this day, and the quantity excreted at intervals of six hours during the evening and night, were examined after the Folin method and also by the colorimeter. The urine was taken by catheter just before examined, the interval between its removal from the body and examination being made as brief as possible.

The results of these investigations show at what period and in how long a time elimination occurred. Where the kidneys were normal in two periods of six hours each, the quantity administered was practically eliminated. If, however, elimination was postponed beyond this period to the afternoon or evening of the day and even later, there was evidently some improvement in the function of the kidneys. The termination of the period of elimination could be recognized by the fact that the quantity of creatinin was not greater in the afternoon than that eliminated in the forenoon. Lessened increase in elimination might sometimes result from physiological variation in the patient. When the kidneys were normal, the greater part of elimination occurred in the first six hours after the substance was taken. In 83 per cent. of cases with normal kidneys, the remainder of the substance to be eliminated was discharged in the second period of six hours. By comparing the elimination in various periods of the day, a fairly accurate idea could be obtained concerning the rapidity of the process.

As an aid in the clinical study of patients, the writer advises that, if the clinical symptoms of diseased conditions of the kidneys be present during pregnancy, although not sufficiently pronounced to warrant the interruption of pregnancy, this test be made, and, if no improvement follows in a short time after the first test and the second is positive, and indicates deficient elimination, the pregnancy be interrupted.

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvii, Heft 2.

ALBUMINURIC RETINITIS AND THE TOXEMIAS OF PREGNANCY. Miller¹ discusses the previous literature of albuminuric retinitis, and describes 17 cases, with clinical notes. Some of the material in this study was obtained during the writer's studies at the Vienna Hospital. In all of these patients, nephritis was present; some had eclampsia and some were toxemic without eclampsia. In 5 of the cases proving fatal, autopsy was obtained. The writer concludes that albuminuric retinitis in pregnancy is strongly indicative of primary nephritis, although it is not invariably present in the toxemia of pregnancy. The value of an eye examination in such a case lies in the fact that it gives early diagnosis of the condition of the kidney, and this puts the obstetrician upon his guard. It is also valuable not only in the prognosis of a given case, but in forecasting the future of such a patient.

The reviewer has repeatedly had occasion to have the eyes of pregnant patients who showed abnormality in elimination critically examined. In one primipara, with high pulse tension and albuminuria, there was great distention of the vessels of the retina, with a minor degree of hemorrhage. This patient came into spontaneous labor with the birth of a living child. She recovered with practically good vision. In her second pregnancy, the same condition developed and pregnancy ended in the birth of a dead child, the mother making a good recovery. Her sight remained practically undamaged.

In the case of a gouty multipara, who had in her first pregnancy passed through a very severe eclampsia with damage to one retina, hepatic toxemia developed at about the seventh month, following violent excitement. Examination of the eyes, however, showed that no recent damage had been done. The patient had been under critical observation during her pregnancy and soon after gave birth prematurely to a living child that died shortly after of exhaustion. Autopsy upon the child showed toxemia, with hemorrhages beneath the capsule of the liver. The mother made a good recovery.

In the case of a young woman in her second pregnancy symptoms of toxemia with distention of the vessels of the retina developed, although the urine remained normal. Repeated examination of the eyes showed that the condition was increasing and the danger of hemorrhage into the retina was present. Labor was accordingly induced, with the prompt recovery of the mother. The child was born living and survived in good condition.

Obstetricians consider albuminuric retinitis as a grave symptom occurring in pregnancy. The reviewer believes that the eyes should be examined in all cases of toxemia, and especially in border-line cases when elimination is deficient, but when no definite symptoms have developed. Appropriate treatment can be given, or labor terminated prematurely, in these cases, greatly to the advantage of mother and child.

¹ American Journal of Obstetrics, August, 1915.

THE PSYCHOSES AND NEUROSES OF THE PARTURIENT WOMAN. McCarthy,¹ in dealing with the etiology of insanity in pregnancy and in the period of nursing, believes that the theory of intoxication or auto-intoxication as the cause of mental disease affords the best explanation in this condition. The type of disorder will depend not only upon the infection but upon the character of the brain and nervous system upon which the infected material works.

Heredity is present in about 35 per cent. of cases of insanity affecting parturient women. Moral and physical causes are important with these cases, and one sees the bad effect upon the mind of illegitimate pregnancy, in Closton's statement that 25 per cent. of his cases of insanity complicating pregnancy occurred in patients in whom the pregnancy was illegitimate. Epilepsy has a distinct bearing, the heredity of consumption, and anything leading to a nervous breakdown, as in the cases referred to by Fordyce Barker, in which, in 13 women who had puerperal insanity, it was found that they were the wives of physicians all but one of them primiparæ, who had acquired a dread and anxiety concerning labor through reading medical books and hearing the histories of patients. Latent syphilis is also an important factor, and chronic anemia has a distinct bearing; also a pre-existing tubercular process which may be in a quiescent stage. Disorders of the internal secretions have considerable influence, while the depressing and exhausting elements of prolonged, difficult, and painful labor, and the strain of lactation, contribute.

As a rule, mental disease in the parturient woman develops gradually. It is estimated that it requires not much more than 50 per cent. of the mental power of an individual to carry on the ordinary activities of life, and, evidently, a patient may be considerably below normal without attracting attention. Relatively few cases develop during pregnancy compared with those which come on while the mother is nursing the child.

It is interesting to observe what percentage of insane women have become so through parturition or lactation. Eight per cent. is given from the statistics of various large institutions and is the average with large numbers of cases.

It is also interesting to inquire how often the parturient woman becomes insane. Statistics vary greatly upon this point, but 1 case in 400 labors seems a fairly accurate estimate.

The clinical picture of puerperal insanity is usually that of depression, developing slowly. While hysterical outbreaks may occur, such should not be mistaken for genuine mania. The former yield more rapidly to tonic treatment, while the pregnant woman who is depressed and maniacal, and cannot be isolated, grows worse by rest and requires

¹ American Journal of Obstetrics, August, 1915.

close attention. At the time of labor, great excitement may occur, with ideas of self-destruction and the destruction of the child. This rarely lasts during the lactation period. When temporary mental disturbance occurs in women who have had anesthesia and difficult delivery, and who have shown deficient elimination, the mental condition often clears up rapidly under proper treatment.

As regards prognosis, it is usually good. If, however, there is a history of dementia precox or paresis before pregnancy, the prognosis is unfavorable or guarded. A pre-existing syphilitic intoxication is almost invariably present in parietic cases.

McCarthy gives the statistics of 3600 women admitted to the Philadelphia Hospital for the Insane. Of these, 129 had puerperal insanity (3.6 per cent. of the whole number). The results of treatment were: Recovery in 73 per cent.; 17 per cent. became chronically insane; 10 per cent. died. The length of time in the institution required for a cure varied from one day to five years. It is interesting to observe that cases of puerperal insanity are becoming, at least in our cities, distinctly less in number. This is the result of an improvement in obstetrics, whereby toxemia is diagnosticated and treated more promptly and abdominal section spares many patients from the strain of improperly chosen and performed vaginal deliveries. It is observed that the favorable result of treatment is in proportion to the prompt treatment of the patient. While it is not desirable that these patients be subjected to the depressing surroundings of an insane asylum, they should, however, promptly receive rest, selected feeding, good nursing, and all those agencies which tend to establish elimination and promote nutrition.

The reviewer would call attention to two points of clinical interest to obstetricians in dealing with the insane during pregnancy. When a pregnant patient, having acute melancholia, comes into labor under the stimulus of pain, she may become actively maniacal and destroy her child. In the experience of the reviewer, such a case is exceedingly difficult to manage, resisting anesthesia and giving no signs of the actual progress of labor. Care should be taken that the child is not placed within the mother's reach, and it is better if she does not see nor hear the child. These cases often prove fatal from exhaustion. It is impossible to keep them aseptic, and infection may develop and prove fatal.

The insane have a curious resistance, in chronic insanity, to the induction of labor. The ordinary methods of introducing bougies or bags are entirely unsuccessful.

In the observation of the reviewer, it is better to obtain the necessary permission from guardians or parents, and to deliver these patients under anesthesia by section without labor and then to perform sterilization. The results of such practice in his hands have been good.

Plahl,¹ from Ehrendorfer's Clinic in Innsbruck, draws attention to

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 4.

the peculiar combination of nervous symptoms described by Korsakoff, and known as Korsakoff's psychosis. This consists in neuritis with paralysis complicated by practically uncontrollable nausea and vomiting.

Plahl's case was in the ninth month of pregnancy suffering with pernicious nausea and vomiting. Upon examination, the patient was jaundiced, the gums were swollen, the region of the liver tender on pressure, the spleen could not be palpated, the lungs were normal, the action of the heart rapid, the pulse full (140), the temperature 96.5° F. The fundus of the uterus was two fingers' breadth beneath the umbilicus, and the uterus was soft and relaxed, and indicated a pregnancy of about five months. Fetal heart sounds could not be heard, and vaginal examination showed that the cervix had been deeply torn in a former labor, that the uterus was relaxed, but that no tumor or inflammation could be made out in the pelvis. The patellar reflex was wanting; the urine was of high specific gravity, the quantity lessened and containing no albumin, sugar, or biliary coloring matter.

The patient was nourished for sometime after admission to the hospital by nutrient enemata and seemed to improve. Eight days after admission, she complained of giddiness and faintness. She heard badly, and had ringing in the right ear and disturbance of sight. Examination of the eye muscles showed that some groups were paretic. The speech was disordered and taste was perverted. Her strength rapidly declined, she complained of headache, giddiness, pain in the neck, and the face became somewhat cyanotic. The reflexes in the skin of the abdomen and the patellæ were absolutely wanting. Strangely enough, vomiting ceased, and the patient had a decided appetite for food. She developed symptoms of basal meningitis. Examination of the eyes showed hemorrhage into the retinæ, with paralysis of some of the ocular muscles. In the ears was found retraction of both tympana. The examination of the urine was negative, and the estimation of its nitrogen showed that considerable nitrogen was excreted. Folin's tests were negative. Lumbar puncture gave a clear fluid containing a few red blood cells. The Wassermann reaction was negative, not only in fluid taken from the cord, but in blood taken from the cubital vein. There was no fever, but rapid pulse. The patient's mental condition was that of stupor night and day. Some of the patient's symptoms became somewhat better, and she aborted spontaneously, expelling a macerated fetus 25 cm. long. The placenta and membranes were easily expressed and the uterus contracted well, without hemorrhage. This was followed by a period of great excitement, so that the patient had to be restrained in bed, her speech was unintelligible and there was relaxation of the sphincters. The patient was able, however, to take a large quantity of nourishment. After a warm bath, the patient suddenly spoke an intelligible and intelligent sentence. She passed through a tedious convalescence lasting over a year. While she did not completely

recover her health, she became considerably better, although the patellar reflexes never returned.

When the patient's past history was studied, it was found that her first pregnancy had been four years previously. During the first three months of this, she had occasional vomiting but was otherwise healthy. She went to term, and, while being brought to the hospital in labor, she gave spontaneous birth to a recently dead child. There was no autopsy made upon this body. During the second pregnancy, it is possible that one source of the intoxication was the long retention of the macerated fetus in the uterus. Examination of the fetus failed to find evidence of syphilis, but the fetus had evidently been dead in the uterus from ten to fourteen days. She gave a history that, when seventeen years old, she had passed through a very severe typhoid, and it was thought that possibly she was a typhoid carrier, but an examination made of the matter discharged from the bowels failed to find the typhoid bacillus. So far as could be made out, the primary cause of the patient's illness was inanition probably from lack of sufficient good food, hard work, and unfavorable surroundings. Her case closely resembled one of beri-beri.

DISTURBANCES IN THE FUNCTION OF THE LIVER COMPLICATING PREGNANCY. Bauch¹ has made clinical tests upon 22 pregnant patients to determine the clinical data concerning the function of the liver during pregnancy. His method consisted in first ascertaining the fact that the urine of the patient contained no albumin, sugar, acetic compounds or biliary coloring matter. After the urinary bladder had been emptied, the first test to determine the quantity of sugar found in the blood was made, and then the pregnant patient was given 40 gms. of galactose in about 400 c.c. of water, this occasioning in none of the patients especial disturbances. In but 1 case was there very transient vomiting, but in none of them did purgation follow. The quantity of urine passed in twenty-four hours was collected, and that passed during the first six hours was taken at two hour periods, measured and examined not only for sugar, but by the polariscope. One or two hours after the first urinary examination was made, the second examination of the blood was made to determine the quantity of sugar. There was no especial restriction in the patient's diet.

In the 22 patients so examined and apparently healthy, 14, 63 per cent., showed but the faintest trace or no sugar in the urine. Eight of these patients, 37 per cent., eliminated sugar, 0.4 to 1.8 gm., but this quantity is not unusual in healthy women who are not pregnant, and who have been given a considerable quantity of sugar to eat, so that excretion could not be considered as pathological. The sugar content of the blood was not altered, and hyperglycemia was not observed.

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xlii, Heft 3.

In one patient, who showed the symptoms of a very moderate toxicosis of pregnancy, and who had, before the administration of galactose, a hyperglycemic condition of the blood, this increased markedly after the giving of the galactose.

These researches indicate very clearly that, in the healthy pregnant woman, a considerable quantity of milk sugar is disposed of by the liver without disturbance. When one remembers that milk sugar is normally present during the latter weeks of gestation when breast milk is forming, and that the liver of the patient must be especially active in this regard during the latter weeks of pregnancy, the condition found by the writer is what might naturally have been expected.

ACIDOSIS AND THE NITROGEN PARTITION IN PREGNANCY. Murray¹ describes three different methods which he has employed for making the nitrogen estimation and also the test for acidosis. He examined 80 cases, nearly all of whom were examined on more than one occasion, and the majority of the examinations were conducted during the last six weeks of pregnancy.

In 66 cases the ammonia coefficient ranged from 2.2 to 12 per cent. These results did not agree with those of Williamson, which are 4 to 5 per cent. They, however, closely resemble the statistics given by Ewing and Wolf—2.3 to 10.8 per cent.

In 72 per cent. of Murray's cases, the ammonia coefficient was over 5.5 per cent.; in 20 per cent. of the cases over 8 per cent. As pregnancy advanced, there was a definite tendency for this percentage to become higher and to be highest in labor. In no case was the coefficient above 5.5 per cent. obtained before the fifth month.

Of the many cases examined during labor, 2 had high readings (13 per cent. and 17 per cent.). There was neither albumin nor acetone bodies in either case, and as soon as labor was over the index dropped very rapidly.

Two patients in labor showed the presence of acetone bodies amounting to an index per liter of 1.5 and 1 respectively. The corresponding ammonia coefficients were 9 and 10 per cent. In one of these the tolerance test for alkali was done, but no evidence of retention was made out and the coefficient fell.

There were 4 cases of late pregnancy in which examination showed a high ammonia value (9 to 12 per cent.) without acetone bodies, and, in these, the tolerance test was carried out; in none was there any difficulty in rendering the urine alkaline. In 66 cases a trace of albumin was found in 9, but the presence of albumin had no relation to a high ammonia coefficient.

He describes several cases of pernicious nausea in which the ammonia coefficient was high, and in some of whom acetone bodies were present.

¹ British Medical Journal, January 23, 1915.

One case was acute, and during a week in which three tests were made, ammonia coefficient, temperature, and pulse remained normal without acetone or albumin. The pregnancy was two and half months, and, as the patient could retain nothing on the stomach, nutrient enema of glucose and pancreatized milk were given for twenty-four hours and well retained. There was apparent improvement for several days, but the pulse became more rapid and the temperature rose. Ammonia coefficient reached 15 and then 25 per cent.; acetone and diacetic acid appeared in the urine, but these bodies were not estimated. There was greatly increased tolerance to sodium bicarbonate without reduction of the ammonia coefficient. Therapeutic abortion was produced, followed by the immediate recovery of the patient.

In a second case of pernicious nausea at about the fifth month, the temperature was irregular and a moderate quantity of albumin was present. There was a very slight deposit of pus in the urine. The ammonia coefficient at first was 4.9 per cent., and the patient apparently improved for a week, when acetone bodies appeared, with an index of 4 per liter, and the ammonia coefficient rose to 20.3 per cent. Alkali, given as a tolerance test and as a therapeutic measure, reduced the coefficient to 9.2 per cent. Interference was declined, the patient ultimately making a good recovery.

Other cases of pernicious nausea, less severe, developed coefficients of 10 per cent. and 11.8 per cent. In the latter, acetone bodies were absent, but, in the former, at the third month an index of 1.7 per liter was found and remained so for a few days, when spontaneous abortion occurred. There were 5 cases of eclampsia; in 1, an acidosis index; the other 4 were negative. This experience closely coincides with that of Ewing and Wolf in their researches. In these cases of eclampsia, the ammonia coefficient ranged between 13 and 18 per cent. in 4 cases. These patients were all in labor when the tests were taken, so that there was no very great rise. In 3, there was normal index very quickly after labor. In the fourth, mental disturbance developed, and the coefficient remained high for a week and then subsided gradually, with return to a normal mental condition.

The fifth case was fatal. Upon admission, the ammonia coefficient was 8.5 per cent., while the urine in the bladder at death, six hours later, gave a reading of 6 per cent. There was very slight albuminuria and no acetone. There was no opportunity for a tolerance test. Autopsy showed that the patient had died of cerebral hemorrhage. She had, however, a very marked necrosis in the liver of the kind characteristic of the disease, and it is of interest to observe that this case had a lower ammonia coefficient than any of the others.

The so-called pre-eclamptic state gave two examples at the ninth month with moderate albumin, showing ammonia coefficients of 11.3 and 10.4 per cent. without acetone. These figures, however, gave less

accurate indication of the patient's condition than the clinical examination, which revealed well-marked edema, headache, and a much diminished secretion of urine of high specific gravity.

Two cases of nephritis in pregnancy were examined. The first in the seventh month with scanty urine; ammonia coefficient, 3.5 per cent.; albumin, 0.7 Esbach, and no acetone. The patient suffered considerable from breathlessness, and there was moderate edema. In spite of the low coefficient, in the absence of acid bodies, it seems fair to consider this a case of acidosis. This patient came into spontaneous labor thirty-six hours after her first examination and gave birth to a living child. The mother died a few days afterward of uremia.

Murray's second case was also in the seventh month, with great edema and albuminuric retinitis. There was no acetone in the urine, but the ammonia coefficient was 16.4 per cent. and albumin 1 Esbach. There was normal tolerance to alkali. It was thought imperative to interrupt the pregnancy, which was done by the use of bougies, and after delivery in three days the coefficient had fallen to 9.1 per cent.; in a week afterward to 4 per cent. The albumin in the urine and the patient's well-marked edema rapidly disappeared.

There was 1 case which Murray styles, *Toxemia of Doubtful Origin*. This patient was four months advanced in pregnancy, with headache, fever, drowsiness, and occasional vomiting. The ammonia coefficient was 5 per cent., the acetone bodies were absent, and alkali was tolerated normally.

Upon searching further for the cause of the condition, a Widal reaction proved positive, the patient subsequently aborted and developed typhoid fever.

In summing up the results of his studies on this subject, Murray frankly admits that he feels scarcely more confidence in his interpretation of many of the results than he does in a interpretation of acidosis in general. He does, however, believe that if one will closely compare the clinical condition of a pregnant woman with the results of the examination of the urine, one is in a better position to justly estimate the condition of the patient, and will the sooner apprehend grave developments. A positive decision concerning the value of these methods should, in the present stage of our knowledge, be reserved.

THE TREATMENT OF THE TOXEMIA OF LATER PREGNANCY. Byers¹ reports several cases of the toxemia of later pregnancy in the hospitals of Belfast. The first was admitted in the seventh month of her first pregnancy, obstinately constipated, sleeping poorly, restless, and with swollen face, legs, and feet. For six weeks, she had had severe headaches, floating spots before her eyes, failing sight and a bad taste in the mouth. On the day before admission, the headache became

¹ British Medical Journal, May 22, 1915.

very severe, with constant vomiting. The patient grew rapidly worse, became semicomatose, and, on admission, it was stated that just previously she had had convulsions. When admitted to the hospital, the patient was stupid, but could answer questions and swallow fairly well. There had been no convulsions since admission. The face about the eyelids was swollen, temperature and pulse normal (80), and urine, taken by catheter, was dark fawn-colored, acid, 10.32, with a large quantity of albumin. There was no sign of labor, and the pregnant uterus was above the umbilicus. The fetal heart could be heard and the fetal parts made out by palpation.

The treatment consisted of morphin and atropin, washing out the stomach with sodium bicarbonate and water, castor oil, and croton oil being left in the stomach. Enemata were unsuccessful, and it was not until the bowels had been thoroughly irrigated with warm solution of bicarbonate of soda, and further active purges had been inserted in the stomach, that the bowels began to move.

Examination of the urine showed a specific gravity of 10.30, very acid, its proportionate acidity being four times that of normal. There was an abundant deposit of urates, transitional epithelial cells and few granular casts; albumin in large quantity, urea diminished 50 per cent., ammonia coefficient more than double the average. After the bowels had moved thoroughly, the patient improved, but did not come into labor, and was discharged from the hospital. She was instructed to return for confinement, but labor developed very rapidly about two months after her discharge, and she gave spontaneous birth to a dead child. Her own condition remained good.

The second case was admitted suffering from eclamptic convulsions, the patient having had three before admission. She was given castor oil and croton oil by mouth, the bowel was irrigated by sodium bicarbonate solution, and morphin given hypodermatically. The patient was within two weeks of full term. Severe constipation was present, and, in addition to other treatment, solution of bicarbonate was injected beneath each breast. The stomach was irrigated, the castor oil and croton oil repeated and $\frac{1}{4}$ grain morphine given hypodermatically ever two hours. The patient had six convulsions during the day and seemed greatly prostrated. At the evening she came into labor and was delivered by forceps, and had a convulsion soon after delivery. Under chloroform, a lacerated perineum was closed, the patient having a convulsion as soon as the chloroform was removed. There was very scanty excretion of urine and one bowel movement. The child was born pallid and asphyxiated, but was revived. Eight days after labor the patient developed maniacal symptoms and was removed to a hospital for insane. Twelve days after her removal to the hospital for insane, the urine was still very acid, containing abundant albumin and acetone; the child survived.

His third case was a primipara near term who had had seven convulsions before admission. Morphine was used very freely to control convulsions until $1\frac{1}{2}$ grains had been given. The effort was made to leave castor oil and croton oil within the stomach, by introducing it through a tube, but this was vomited. An intravenous injection of sodium bicarbonate solution was tried and failed, and but a few ounces could be finally inserted. As labor developed, the membranes ruptured and four hours later the patient was delivered by forceps with slight laceration. One cubic centimeter of pituitrin was injected hypodermatically to cause uterine contraction. In all, the patient had 17 convulsions; 14 before confinement and 3 after. The patient developed symptoms of slight mental disturbance which gradually subsided, and she steadily improved. The child became cyanosed, had general anasarca, and died on the second day with signs of bronchopneumonia. The patient gradually made a fairly good recovery.

Byers considers that the toxemia of later pregnancy occurs about once in 500 cases. He distinguishes pre-eclamptic toxemia, which may be very mild or very severe, but in which convulsions do not occur. There is great disturbance of the nervous system, swellings in various portions of the body, epigastric pain, an examination of the urine usually clearing up the diagnosis.

In the second class, he places those patients who have toxemia with a pre-existing kidney lesion before they became pregnant. Changes in the eye, revealed by ophthalmic examination, are valuable in making a diagnosis of this condition. Extensive changes in the eye are of grave significance. In pre-eclamptic toxemia, the total quantity of urine is diminished, and the nitrogen and urea are lessened, while in nephritic toxemia, one may observe cases in which these bodies are increased. In the pre-eclamptic cases, the albumin is paraglobulin, while in nephritic toxemia it is serum albumin.

In the third class of toxemias, after the sixth month, come cases of eclampsia with convulsions and coma.

He does not consider cases of eclampsia without convulsions as sufficiently significant to demand separate classification.

In discussing the treatment of the toxemia of late pregnancy, he draws attention to the importance of frequent analyses of the urine throughout pregnancy. When symptoms of danger develop, the patient should be kept in bed, given a milk diet, and hot baths and free purgation employed, with warm saline lavage of the stomach and intestines. In nephritic cases, if, in spite of this treatment, the patient grows worse, labor must be induced. He believes that it should be made compulsory, for patients who desire to obtain assistance for confinement, that the urine be repeatedly examined.

The treatment of eclampsia is discussed, various methods are described and the statistics of the treatment of eclampsia by immediate operation

are given with reference to Routh's paper, Peterson's paper, and the statistics in Bumm's Clinic in Berlin.

In contrast to this is the treatment addressed especially to the toxemic condition when no forced delivery is accomplished, but where labor is assisted when it develops. He alludes to the so-called "Rotunda method," which is largely that of elimination, with the use of morphin to control convulsions. He quotes statistics given by Tweedy (78 cases of eclampsia) with mortality of 7.7 per cent. Strogonoff's expectant method, in 900 cases, gave a mortality of 7 per cent.

Byers personally prefers the treatment of eclampsia by the immediate securing of elimination, by which his results are very much like those obtained by Tweedy and Strogonoff.

Thaler and Zuckermann¹ report the interesting case of a patient, four weeks pregnant, upon whom total extirpation of the uterus was performed for the cure of a myoma, with the removal of both adnexa.

The patient, aged forty years, had always been healthy and had had no previous pregnancy; menstruation had been regular. There had been amenorrhea, with pain in the right lower abdomen. Upon examination, a hard, firm, uterine tumor, reaching to the umbilicus, was found. This tumor filled the pelvis. At operation, several large nodules were present in the tumor, and, upon opening it in the cavity of the uterus an ovum 1 cm. in length was found. There was a large fresh corpus luteum in the right ovary. The patient reacted well from operation, but, on the evening of the first day, complained of violent headache, and, forty-one hours after the operation was seized with a typical eclamptic convulsion. In the following eight hours she had four more, with the rapid development of albuminuria and the presence of casts in the urine. Morphin and chloral hydrate were given to control the convulsions and the patient gradually improved and was discharged from the hospital eighteen days after operation in good condition. In the literature on the subject, the writers found 12 cases of eclampsia during the first three months of pregnancy. Their cases are among the earliest of which we have knowledge.

THE TREATMENT OF THE KIDNEY OF PREGNANCY AND OF ECLAMPSIA. Gessner² replies at some length to Stoeckel's paper, criticizing his description of the relation existing between the neck of the urinary bladder and the cervix uteri. Gessner believes that the anatomical relations are such that pressure is exerted during pregnancy upon the uterus, and, as a result, urine accumulates in the pelvis of the kidney. He draws attention to the researches of Halbertmach and Kundret, and also of Stadtfeld. The sections performed by the latter have been supplemented and confirmed by Weibel, who examined 100 normal pregnant women at the end of pregnancy by the use of the cystoscope, and

¹ Zentralbl. f. Gynäk., 1915, No. 21.

² Ibid., No. 27.

in 47 per cent. of the cases was able to demonstrate conclusively the chronic stasis of urine in the ureters, usually in the abdominal portions. Although these patients gave no symptoms of pyelitis, in the normal pelvis the ureter is complete protection from the pressure of the uterus and its contents. The normal dextro-torsion of the womb in later pregnancy usually produces pressure upon the right ureter, but this does not account for the fact that urine was found accumulated in both ureters. Furthermore, the pelvis was normal in these cases and in primiparæ the head had readily descended without unusual pressure. Gessner's contention is that the stasis of urine is produced by the tension on the neck of the bladder, and that the anatomical relations of the right ureter as it passes over the brim of the pelvis accounts for its greater dilatation.

THE INFLUENCE OF SUGAR IN THE BLOOD UPON THE OCCURRENCE OF ECLAMPSIA. Widen¹ has examined the urine in 8 cases of eclampsia and estimated the quantity of sugar in the blood in these patients. He found that hyperglycemia is absent in the severest cases of eclampsia. This corresponds with the results obtained by experiments upon animals which indicate that, when the vitality of the animal is greatly depressed and blood tension is much reduced, experimental hyperglycemia is absent. So when 1 mgm. of adrenalin was injected into the veins of an animal, the quantity of blood sugar diminished, while a similar injection given subcutaneously caused an increase. This is explained by the fact that the intravenous injection caused a marked fall in the pulse tension.

It is considered a favorable sign if, in a case of eclampsia, hyperglycemia is present. It seems in some way to indicate that the patient has a decided power of resistance.

As regards the source of the excess of sugar in the blood in eclamptic patients, we have as yet no adequate data. The number of convulsions seems to have a relationship with the degree of sugar excess. But more accurate than this is the degree of intoxication present. A mild degree of intoxication causes a slight increase in the quantity of blood sugar; a moderate intoxication produces great hyperglycemia, while, in the severest cases, this symptom is lacking entirely. So, in moderate or severe intoxications, the hyperglycemia lasts longer than when the intoxication is but slight. Although convulsions may cease, hyperglycemia may persist for sometime. When, however, the period of intoxication ends, the hyperglycemia disappears. One is thus able to form some idea of the severity of the condition by the degree of hyperglycemia present or by its absence.

The delivery of the child has very little effect upon hyperglycemia. A slight increase is sometimes observed. The disordered condition of

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 2.

the kidneys seems in no way responsible for hyperglycemia, for this is often found when albuminuria is very slight, and in other cases where large quantities of albumin are present.

In cases of pernicious nausea, hyperglycemia is present, but in greatly varying degree. By the administration of glucose, Widen was able to show that in pregnancy the kidneys are more sensitive than normal and permit the passage of the sugar in the urine much more readily. The writer also examined blood taken from the umbilical cord of the child and compared its sugar content with that of the mother's blood, especially in cases of eclampsia. He found reason to believe that the blood sugar of the mother did not diffuse into the fetal blood. He believes that sugar found in the blood of the fetus is formed there by the fetal organs themselves or is made in the placenta and transmitted to the fetus.

The reviewer has given a thorough trial to all methods in the treatment of toxemia, with or without convulsions. Each year's experience establishes firmly in his mind the value of the following procedures to be carried out in the order named:

That no effort be made whatsoever to control convulsions; that constant effort be made to prevent the patient from injuring herself by biting her tongue or throwing herself upon the floor. This latter is to be carried out by placing between the jaws, at the angle of the mouth, a blunt object wrapped in soft, firm material. In the hospital one of the flat pine sticks, used to depress the tongue in throat examinations, covered by one or two folds of a sterile towel or sterile gauze makes an excellent object. In houses, the handle of a toothbrush covered by soft linen of several thicknesses is also useful. The patient's mouth should be systematically, but gently cleansed by wiping away all secretion by sterile gauze. The nose to be oiled and kept clean with sterile olive oil on pledgets of cotton.

Whether winter or summer, the patient's skin should be washed clean with soap and hot water and the patient placed between blankets.

The stomach to be thoroughly irrigated with hot water and bicarbonate of soda, and from 2.5 to 5 grains of calomel with bicarbonate of soda to be left within the stomach. From 10 to 16 ounces of blood to be taken from a vein and from 16 to 32 ounces of sterile salt solution to be injected into the vein. This should be done independently of the pulse tension, and the amount of blood taken and salt solution given should depend upon the degree of toxemia present. A low pulse tension is no contraindication to bleeding if followed by transfusion.

The bladder to be emptied by catheter, and the urine, if any is obtained, reserved for examination. The bowel to be very thorough and persistently irrigated through a medium-sized rubber tube, passed as high as possible, using 2 gallons of hot normal salt solution; if possible, a quart of the last of the irrigation to be left for absorption.

After this treatment, the patient should be left alone until she has had ample opportunity to grow better or worse. No vaginal examination should be made unless the patient is in labor or shows signs of labor. If, upon vaginal examination, the patient is a primipara, and the membranes are unruptured and the cervix but partly dilated or undilated, no interference should be practised. If the patient be a primipara and dilatation be complete and the head well engaged and descending, if labor is in active progress, the patient should be allowed to deliver herself spontaneously if pains continue good; if not, under anesthesia with oxygen and ether, she should be delivered by forceps. If the patient be a multipara, with the head well engaged and half-dilatation of the cervix, the membranes should be ruptured, and the patient, if possible, allowed to deliver herself.

If eliminative treatment has been carried out thoroughly, and after a reasonable time there is no improvement and no sign of labor, the genital canal remaining undilated, the patient should be delivered by section, in the early months of pregnancy by vaginal section, and after the seventh month by abdominal section. Repeated irrigation of the intestine may be carried out as often as it seems advisable. The number of convulsions is of comparatively little importance, as statistics show that it is not the number of convulsions, but the severity of the intoxication present which determines the mortality. No effort should be made to save the child at the expense of the mother, as the child frequently dies from toxemia either before or after birth.

In the experience of the reviewer, it is very seldom advisable to perform either vaginal or adominal Cesarean section in the treatment of eclampsia. The treatment of toxemia is the important factor, and, if this be carried out thoroughly, the patient will either show signs of labor and require assistance in vaginal delivery only, or else will recover, or die without giving any signs of labor. In these latter cases, rapid delivery is of no avail.

INFLUENZA COMPLICATING PREGNANCY AND AS A FACTOR IN PUERPERAL SEPSIS. INFLUENZA OF THE GENITAL ORGANS COMPLICATING PREGNANCY. Thaler and Zuckermann¹ describe the case of a primipara, aged nineteen years, who had been in apparently sound health during her pregnancy. She was admitted to the hospital at the beginning of the tenth lunar month, and, in the portion of the hospital to which she went, there was at the time no catarrhal disease present. Eight days after admission, while the patient was apparently in a normal condition, without pain, an examination was made of the vaginal secretion.

The result of this was extraordinary. The secretion was swarming with Pfeiffer's influenza bacilli, and, in addition, contained cocci and

¹ Zentralbl. f. Gynäk., 1915, No. 21.

vaginal bacilli. Smears upon blood agar were made from this secretion and, after twenty-four hours, showed a few colonies of staphylococci, but the characteristic growth of the influenza bacillus was plainly evident. Further studies in their development established their identity.

Thirty-eight hours after the first examination of the vaginal secretion, the first painful contractions of the uterus began. Soon after the patient complained of headache and feeling heat, apathy, and, although an ice-bag was placed upon the head, there was a rise in temperature. These symptoms continued for seventeen hours when the membranes ruptured and soon afterward a healthy child, 48 cm. long and weighing 2650 gms., was born.

On the day after her confinement, the patient was somewhat better. On the second and third days after labor she had high fever, great prostration and apathy. The temperature slowly came down, and, on the seventh day, the patient's temperature was normal and shortly afterward she was discharged from the hospital in good condition, and with uterine involution well advanced. During the entire time of her illness, there was no symptom whatever connected with the organs of respiration in either mother or child. Examination of the lochial secretion on the third and fifth days of the puerperal period showed the same bacteriological condition which had pertained before the confinement. On the tenth day after labor the influenza bacilli had disappeared from the vaginal secretion. This agrees with the observation of Wassermann, who found that when the influenza bacilli become localized, they disappear more rapidly with the cessation of the clinical phenomena than when they are diffused through the body. On the fifth day of the puerperal period, an examination of the blood showed it to be sterile. This is probably the first case in which Pfeiffer's influenza bacillus has been clearly demonstrated to be the cause of puerperal fever. The case was furthermore interesting in that fever developed and infection was clearly present before the membranes had ruptured. Excluding cases of placenta previa or premature separation of the normally implanted placenta, no other case has been observed in which fever has developed during labor before the rupture of the membranes.

Abortion. THE OCCURRENCE, THE PREVENTION AND TREATMENT OF ARTIFICIAL RUPTURE OF THE UTERUS DURING ABORTION. Schweitzer¹ has reviewed the literature of this subject, collecting 105 cases in all, with a mortality of over 25 per cent. This is considerably less than the mortality of rupture of the uterus complicating parturition, but it is sufficiently high to indicate the serious character of the complication.

As to the conditions which predispose to this accident, one must remember that the pregnant uterus is in a condition to be readily

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xlii, Heft 2.

perforated. During its growth, as pregnancy advances, the uterine muscle is softer than normal and yields readily to a comparatively sharp instrument. In cases in which a pathological process is present at the site of the embryo, the muscular tissue at this point is more than usually soft and readily yields to manipulation. Such is especially the case where a blighted ovum has been present in the uterus and where the wall of the womb has been infiltrated with blood.

Abnormal conditions of the uterus in flexion or displacements predispose to perforation, because the curve of the uterus being unusual, an instrument inserted in the customary manner, will readily come against the uterine wall.

In almost every instance, perforation is made by an instrument, and rarely by the hand or finger. The writer believes that it is not the instrument itself but its improper employment which produces the accident. A proof of this is found in the fact that the finger of the operator, whether covered by a glove or not, has repeatedly perforated the uterus. The laminaria tent has frequently produced perforation of the uterus, not only during the process of dilatation but at the time of its removal. This is especially apt to occur if the tent is taken out and reinserted and pushed higher in the uterus. Greenbaum reports a fatal case of peritonitis caused in this way. When it is difficult to remove a tent, it is sometimes necessary to split the anterior wall of the cervix in order that it may be safely grasped.

Hagar's solid dilators frequently produce longitudinal tears at the upper portion of the cervix and through such a tear the finger or instrument could readily be inserted into the pelvic or abdominal cavity. Cases in which the cervix is especially narrow and constricted are always dangerous for dilatation because the tissues may yield suddenly and the dilator go much farther and in a direction entirely different from that designed.

A small sharp curette has long been known to be an exceedingly dangerous instrument. A young ovum may possibly be removed by such a curette, but, if pregnancy has reached four or five months, it is impossible to remove it entirely by the curette and a considerable portion must be left behind. The writer states that it is impossible to empty the uterus with any instruments without digital control. In other words, the finger must examine the interior of the uterus and often complete the process. He calls attention to the fact that practitioners will occasionally endeavor to perform a curettage in an office or at the house of the patient, without the use of a speculum and without thoroughly exposing the field of operation.

The placental forceps and other forms of grasping instruments not infrequently cause perforation. They should never be used except under the direct control of the finger within the uterus. It is possible to grasp a portion of the uterine wall with such an instrument and to tear it

away. The great part of the danger which attends this accident lies not only in the injury done to the uterus itself but to surrounding tissues. Wounds of the intestine have been not infrequently observed, and, in the writer's series, 48 such cases were collected, with a mortality of 27 per cent. Of these 48, the small intestine was wounded in 25; the sigmoid flexure or rectum in 15; the ascending or transverse colon in 6; and the appendix in 2. Frequently a portion of the intestine is pulled through into the uterus and may prolapse into the vagina. When the bowel only prolapses through a rent in the uterus without a wound of the intestine, the danger is naturally considerably less. There were 6 such cases in the series of the writer. In 10 cases the omentum was wounded or prolapsed, but this is far less dangerous than wound of the intestine. In 2 cases a Fallopian tube or an ovary was injured. In 1, the urinary bladder was wounded; in 1, the right ureter at its entrance into the bladder and also at the pelvis of the kidney. The ureter was torn from the kidney so that the kidney had to be removed. The patient, however, finally recovered. Injury to the promontory of the sacrum has arisen from the same cause. It is often difficult to accurately ascertain the condition present unless the tissues can be examined by vision, and hence the necessity for care in dealing with the pregnant uterus.

To prevent this accident, it is first necessary that the cervix be amply dilated. A thorough vaginal examination should precede all manipulation, and sufficient time should be taken to dilate the cervix to permit the introduction of the finger and instruments of good size. The writer prefers the laminaria tent during the first months of pregnancy and that this should be used until the finger can be introduced to thoroughly explore the cavity of the uterus. If the tent does not seem appropriate, he would tampon the cervix and vagina with iodoform gauze, which should not be allowed to remain longer than twelve hours. After the fourth month, Tournier's dilating bag has given him good results. He strongly condemns the metreurynter as a dangerous instrument.

After thorough dilatation, he would employ the finger only to empty the uterus. This may, however, be a longer and more difficult process than if placental forceps or curette be employed. Anesthesia is necessary to relax the abdominal wall. If instruments are employed, it should be done with great caution and only by operators who have had ample experience. When there is pronounced flexion, this may be considerably lessened by making firm traction upon the cervix. It is a help to note the depth of the uterus by introducing an instrument before undertaking to empty. Should a curette or placental forceps suddenly pass beyond the distance ascertained to be the depth of the uterus, the operator must know that perforation has taken place. The statement that the uterus sometimes relaxes and contracts suddenly

during curettage, is not to be considered as of practical value. Nor is it at all probable that the operator has introduced an instrument into the Fallopian tube.

When perforation is diagnosticated, further intra-uterine manipulation must immediately cease. The writer believes that the discovery of this accident should call for consultation with an experienced abdominal surgeon.

Regarding the treatment, no irrigation of the vagina or uterus should be attempted. Septic infection will be greatly increased should this be carried out. Hemorrhage is the least danger and hence there should be no great anxiety to tampon the uterus and vagina. Septic infection and peritonitis are most to be feared.

In some cases, absolute rest, ice-bag placed over the uterus, the administration of opium and styptics may be followed by recovery. When, under strict aseptic precautions, the uterus has been perforated by a sound, making a very small opening, such treatment may be successful. If there is reason to believe that the curette has simply passed through the uterine wall without injuring the intestine, the expectant plan of treatment may also succeed.

In 17 cases treated expectantly, 9 died—6 from peritonitis and 3 of them perished soon after the accident. In 1 case abscess in the uterine wall was found, which had extended into the abdomen and formed an encapsulated collection of pus, walled in by the intestine and omentum. Three weeks after the accident, this abscess ruptured into the peritoneal cavity and death speedily followed. One patient died of general septic infection; 1 apparently did well for some time, but omental adhesions formed and the patient developed ileus and had to be operated upon, but then recovered. One patient had pelvic abscess which was drained, followed by recovery. Another recovered, although she had peritonitis. There were 4 cases of fistula between the intestine and the uterus. This resulted from a direct injury to the intestine, and also from circumscribed abscess. One of these patients died of exhaustion; the remaining 3 recovered. One patient died of collapse. Of the 17, but 2 made uncomplicated recoveries. The mortality of the cases treated expectantly was 53 per cent. An almost incredible case is cited in which a physician had four times perforated the same uterus by the use of instruments. That wounds of the intestine may not be detected is shown by the fact that in three autopsies made upon these patients dying with symptoms of infection, wounds of the intestine were found which had not been recognized.

Obviously, the treatment of this accident should be by operation. Abdominal section is by all odds the safest and most efficient. If possible, any material which has been extruded from the uterus should be removed through the uterus and the abdominal cavity cleansed as well as possible with Ringer's solution to prevent peritonitis. It

may sometimes be difficult to obtain permission to perform abdominal section, simply because the uterus has been perforated, as the operation seems out of proportion to the accident. But experience shows that abdominal section is far safer than waiting or than any other method of treatment.

The abdomen opened, the question at once arises, what shall be done with the uterus? Those who strongly urge conservatism, close the wound in the uterus by suture, while those who believe in radical measures will practise extirpation. If conservatism be followed, the edges of the uterine wound should be excised, so that fresh tissue is brought together and the uterus should be very thoroughly and carefully closed. The wound should be covered with peritoneum, or, if this is impossible, it should be left outside the peritoneal cavity. To accomplish this, after Sigwart's method, the uterus is fastened in the abdominal wound, and, should abscess then develop, it will find ready drainage through the abdominal wall. In attempting to cover the uterine wound with peritoneum, the operator must always take a risk that the stitches may cut through and defeat the purpose of his operation. In 29 cases collected from the literature, treated conservatively, there were 5 deaths, 2 from peritonitis following operation, and in 3 peritonitis was present at the time of operation. Sigwart reports cases having fever and an infected uterus, which recovered without peritonitis by the extraperitoneal method of treatment. If the uterus be left and is already infected, one cannot escape the danger of general peritonitis and septic infection.

In 45 cases treated by abdominal section and extirpation of the uterus, there were 9 deaths. Of these, 6 resulted from peritonitis. Of the remainder, 1 was from collapse, 1 from hemorrhage, and the cause of 1 could not be ascertained. Of the 6 cases of peritonitis, in 5 this complication was present at the time of operation. The shortest time elapsing between the operation and the accident in these cases was twenty-four hours, and in most of them from forty-eight to seventy-two hours had passed.

If the results of conservative treatment and radical treatment are compared, we find that in 27 cases treated conservatively 2 died of peritonitis, 1 of sepsis, making a mortality of 11 per cent. In 36 cases treated radically, but 1 developed peritonitis after the operation (2.8 per cent. mortality).

Among the cases collected in the literature were 8 in which supravaginal amputation of the uterus was practised. Two of these died of peritonitis, 1 of whom had this complication before the operation.

In 6 cases extirpation was performed through the vagina. One of these died of peritonitis already present. One of the objections to this method of operation consists in the fact that by this method it is not possible to cleanse the abdominal cavity in any way.

Wounds of the intestine have a great influence upon the mortality of this accident. The mortality, in cases not complicated by injuries of the intestine, is approximately 7 per cent., while, if this complication be present, the mortality rises to 22.8 per cent. In 12 cases treated by suture and without complications, there was one death of peritonitis (a mortality of 8.3 per cent.). In 24 treated by abdominal extirpation and without especial complications, there was one death from peritonitis—a mortality of 4.2 per cent. In the Leipsic Clinic, 5 cases were treated by extirpation, 3 of whom had septic uteri and one had a severe injury to the intestine. All of these patients recovered. In 4 cases the operation was in the beginning a laparotomy; in 2 of them it terminated by total extirpation with Doyen's method. In 1, the operation was concluded by extirpation through the vagina, and in 1 by supravaginal amputation. In 1 case the uterus was removed through the vagina. Suture of the uterus alone was not employed. But 1 case was treated without operation and made a tedious recovery. Two cases had abscess and peritonitis and finally came to operation, with recovery.

It is evident that expectant treatment can only be employed in the simplest cases where all symptoms are favorable for an aseptic convalescence. When there is considerable injury to the uterus and the possibility of other injury, section and extraction is the safest method. In exceptional cases, when the uterine wound is small and the conditions favorable, suture of the uterus may occasionally be employed.

In the United States, at present the majority of obstetricians are distinctly averse to treating abortion by attempts to empty the uterus with the finger or with instruments. Experience has shown that it is impossible to remove all of the embryo and the decidua. The best results are obtained by thorough dilatation under anesthesia, preferably using the solid dilators. This is followed by packing with 10 per cent. iodoform gauze, which is done with great caution, followed by a vaginal pack of bichloride gauze, raising the uterus in the pelvis and bringing it into normal position. This gauze may remain forty-eight hours, when it is removed and the vagina thoroughly sponged out. If tonic doses of strychnin be given, with or without small doses of ergot, the uterus will safely empty itself with the least possible danger of infection. The essentials of the treatment consist in strict asepsis and antisepsis, surgical anesthesia, sufficient dilatation, and the very careful use of the intra-uterine tampon. It is also exceedingly important that the vaginal tampon leaves the uterus somewhat raised in the pelvis and in its normal position.

THE TREATMENT OF ABORTION COMPLICATED BY FEVER. In *PROGRESSIVE MEDICINE* of September, 1915, p. 175, we gave the results of Holst's¹ treatment of abortion complicated by fever. He very

¹ *Zentralbl. f. Gynäk.*, 1914, No. 32.

cautiously removes from the uterus whatever will readily come away, and follows this by an injection of 50 per cent. alcohol, with drainage by gauze for twenty-four hours. Ergotin he gives by hypodermic injection, and uses an ice-bag upon the abdomen. Dilatation and anesthesia are employed, if necessary. In his series were 21 cases of general septic peritonitis, of whom 16 recovered and 5 died. There were 6 cases of pyemia, with 2 recoveries and 4 deaths. In 32 cases the uterus was emptied by the finger or a blunt curette, with 31 recoveries. In 245 cases without fever, there was no death.

In the *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1915, Band xlii, Heft 2, Benthin writes in defense of conservatism in the treatment of abortion complicated by fever. He refers to his previous publications in the *Zeitschrift, the Deutscher medicin. Wochenschrift*, and the *Proceedings of the German Society for Surgery and Obstetrics* for 1913. In these writings he has shown that, in abortion complicated by fever, active treatment by interference has a mortality of 9.8 per cent., a morbidity of 29 per cent., while the conservative treatment had a mortality of 0.8 per cent. and a morbidity of 9.8 per cent. Where hemolytic streptococci are present, active interference is followed by a mortality of 31.2 per cent., while non-interference has no mortality.

Benthin believes that the best results are obtained by careful avoidance of interference. He quotes at considerable length the statistics of various clinics showing that where curetting is commonly practised, the mortality and morbidity are highest. Where conservatism and avoidance of disturbing the uterus are practised, the results are much better. He would entirely abandon the use of the curette, and explore the uterus with the gloved finger only. In cases infected by the non-hemolytic streptococci, the prognosis is good, and very simple treatment suffices. When hemolytic streptococci are present, there is every reason for avoiding disturbance and avoiding the breaking down of the protecting zone in the wall of the uterus. If there is evidently much débris in the uterus and non-hemolytic streptococci are the infective agent, no harm will be done if the uterus is emptied in the gentlest manner possible, but, if the hemolytic streptococci are present, all disturbance of the pelvic organs should be avoided.

CRIMINAL ABORTION. In the *Zeitschrift f. Geburtshülfe und Gynäkologie*, 1915, Band lxxvii, Heft 3, Benthin contributes a paper upon the subject of criminal abortion, especially in the region of East Prussia. This paper was just at the point of completion in June, 1914, at the breaking out of the war, and its publication has been hindered on this account. The statistics available indicate the frequency of criminal abortion as 0.55 per cent. to 0.94 per cent. Some estimate that of all premature births at all stages of pregnancy, from 70 to 80 per cent. are the result of direct interference. If the records of hospitals are consulted, the writer, in going over the records of ten years' polyclinic service

in 4376 operations, found but 26 of criminal origin. The Dutch statistics vary from 7 to 33 per cent. in accordance with the experience of different obstetricians. The Russian reports indicate a comparatively high percentage—75 to 90—with the estimate that in Petrograd one-third to two-thirds of premature births are the result of direct interference. American statistics are quoted to show that 35 per cent. of all pregnancies are purposely interrupted. The reports of Olshausen's Clinic gave 80 per cent. of operations as criminal, while Doléres, in Paris, reported 50 per cent.

References to the literature of different countries vary greatly in the frequency of criminal abortion. There are quoted the statistics of Baltimore, 15 per cent. So far as criminal prosecutions go, in the year 1911, 1028 persons were arrested in the German Empire charged or suspected to be guilty of this crime. In the district whose centre is Königsburg, there were but 31 prosecutions for this cause. Comparing the country and the town, criminal abortion is much less prevalent in the country than in the city. As regards the social state of the woman, statistics show that it is more frequent among married than among unmarried women. An analysis of 200 cases shows that two-thirds of criminal abortions are brought about by the use of instruments, and the remaining one-third by douches, baths, or use of the tampon, tight lacing, or taking drugs, among which were camphor ergot, ammol, various abortive agents, pills, and green soap. When the effort is made to ascertain who produces criminal abortion, obviously someone accustomed to using obstetrical instruments must be the one to employ them for this purpose. In 14.8 per cent. of the cases, a midwife was proven to have done the operation or aided and abetted it.

When the question of morbidity and mortality is considered, it is at once seen that more women die from criminal abortion than from childbirth and its complications. Peritonitis is the most common cause of death, and is responsible for more than half the fatal cases. General septic infection kills about one-fourth. The remainder perish from embolism, pneumonia, or some other incidental infection.

The statistics of morbidity from different clinics vary greatly. From 3 to 30 and 40 per cent. have more or less serious illness after criminal abortion.

Many of the complications which arise in these cases are caused by wounds and injuries to the pelvic organs, perforation of the uterus, tears of the cervix, injection of air or fluid in the bloodvessels, the passing of catheters or sounds into the bladder or the abdominal cavity, or the taking of poisonous drugs may produce lesions of greater or less severity.

The writer makes an effort to estimate the reason for which criminal abortion was performed. In about one-third the cases the social surroundings of the patient were not satisfactory, and, evidently, the

expense of children could not be borne and still maintain a supposed social standing. In more than one-fourth of the cases, the parents had as many children already as they could support. In one-fourth of the cases the parents did not propose to be inconvenienced by children. In 13 per cent. unmarried women naturally feared the shame of illegitimate pregnancy. In 4 per cent. the mother was ill from some other cause, such as tuberculosis, middle-ear disease, syphilis, weakness, or complications connected with pregnancy, while in a small percentage of cases the mother was afraid that the child would not be healthy or that she herself would die during labor.

The writer goes at some length into a discussion of what can be done to prevent criminal abortion in Germany, and he believes that a very concerted effort should be made in this direction, and that intra-uterine pessaries and intra-uterine syringes should not be commonly within reach of the public. So-called private maternity hospitals must be strictly supervised lest they become centres for this abuse. All cases of abortion should be promptly reported to the health authorities and investigated, if suspicious. Philanthropic efforts are also necessary to improve the general condition of the population.

In nothing is the adage more true than that the unexpected may happen in cases of criminal abortion. The reviewer on one occasion removed from the abdomen of a pregnant patient, by abdominal section, a dirty glass catheter filled with dried urine. The woman had forced this through the wall of the uterus just above the internal os and had lost it in the abdomen. Bacteriological examination of the contents of the catheter showed it to be swarming with bacteria. The patient had very little disturbance following its introduction and removal; the pregnancy was not interrupted and the patient was delivered at term in hospital.

A young woman recently married and supposed to be pregnant was taken by her mother to a criminal abortionist, because pregnancy would interfere with a society season. The abortionist introduced a sound. Chill and fever followed, and, when physicians were summoned, dilatation and curetting were done. This made the patient worse and another set of physicians replaced the former. The young woman died of blood infection with hemolytic streptococci, but there was not the slightest evidence that she had ever been pregnant.

THE PLACENTA.

The placenta, its abnormal situation, separation, and abnormalities, is the topic in obstetrics at present receiving the most wide-spread attention. Examination of the literature of the year 1915 shows an extraordinary number of papers devoted to this subject.

In *Surgery, Gynecology and Obstetrics*, November, 1915, Williams contributes a paper upon "PREMATURE SEPARATION OF THE NORMALLY IMPLANTED PLACENTA."

After reviewing the history, he states that it is his experience that premature separation of the placenta is a more common factor in causing antepartum hemorrhage than placenta previa. In 2000 labors at the Johns Hopkins Hospital, premature separation of the placenta was noted in 17; placenta previa in 14; in 16 there was external hemorrhage, in 8 so severe as to indicate the termination of pregnancy. There was no absolutely concealed hemorrhage in this series. The areas of separation varied from 3 x 5 to 5 x 10 cm.

Regarding the *causation*, trauma may in some cases be the causative factor. There is also some connection between toxemia and this accident.

In *diagnosis*, the most significant feature is the fact that in the latter part of pregnancy or early in labor, the uterus remains as hard as a wooden ball. It does not contract or relax, and, when this condition can be clearly made out, the diagnosis is practically certain.

No judgment can be passed alone upon the amount of blood lost, for hemorrhage may occur and clotted blood be retained within the uterus. The general symptoms of hemorrhage, the change in the patient's hemoglobin content, and the patient's general condition may help in making the diagnosis.

Two cases are reported in detail. One was a primipara, aged twenty-four years, who was suddenly taken with intense abdominal pain. Upon examination, the uterus was hard, and the heart sounds could not be heard. The hemoglobin was 55 per cent. The patient was more comfortable after morphin had been given. The hemoglobin fell to 35 per cent., the uterus remained hard, growing somewhat larger. The pulse gradually rose to 160. Delivery was made by abdominal section, and the placenta found completely detached. The seven months' child was dead.

On turning out the uterus, an area of apoplexy at the placental site was found. The uterus did not contract, and, in view of the condition, supravaginal hysterectomy was performed. On the fifth day the patient received transfusion from her brother, and after this the hemoglobin percentage increased and she gradually recovered. Upon examination of the specimen microscopically, degenerative changes in the arteries, with hemorrhagic infarction, were found.

The second case was aged eighteen years, and was brought to the hospital with considerable vaginal hemorrhage. The hemoglobin was 32 per cent. The uterus was hard, and, upon section, a dead child was extracted. The placenta, having completely separated, was delivered, also a large amount of clotted blood. A condition in one portion of the uterus similar to that found in the first case was present

in this. The right broad ligament was distended with blood and the ovarian vessels were greatly enlarged. Supravaginal hysterectomy was performed. The patient gradually recovered, but, a month after the operation, a tumor had formed in the right lower abdomen which was punctured through the vagina, and the abdominal portion opened extraperitoneally by an incision above, parallel to Poupart's ligament. A large quantity of greenish pus escaped. The patient's recovery after this was uneventful. Microscopic examination revealed the same condition found in the first case.

Among the best of the descriptions of these cases is that of Couvelaire.¹ His description of 3 cases is among the best which we have. Essen-Möller² has also reported and described 3 cases.

In 214 deliveries by abdominal section, the reviewer has twice met the condition described in this paper. In each case the placenta was abnormal. In 1 it separated accidentally, and in the other placenta previa was present. Both were treated by the removal of the body of the uterus, and in both cases recovery followed. In calling the attention of those who witnessed the operation to this, the phrase, originally used by Couvelaire, "placental apoplexy" was employed in describing the condition present.

There can be no question of the necessity for the delivery by abdominal section in cases of pregnancy complicated by signs and symptoms of hemorrhage if the patient is in the later months of gestation. No other method enables the obstetrician to make an accurate diagnosis or to deal efficiently with the conditions present.

Brodhead reported, before the New York Obstetrical Society, *American Journal of Obstetrics*, December, 1915, the case of a woman in her second pregnancy who had hemorrhage during the early months. This, however, ceased, and the patient went to term and was delivered of a living and vigorous child. There was hemorrhage during two succeeding pregnancies, and when the patient came under observation at eight and a half months, a breech presentation was present. External version was unsuccessful. The child was born spontaneously, moderately asphyxiated, but soon revived. Immediately after the birth of the head, two large blood-clots weighing about two pounds were expelled. A partial separation of the placenta had occurred during labor which accounted for the asphyxia present in the child, and also for the unusual pain which the patient suffered. The placenta was strongly adherent to the right horn of the uterus, and had to be delivered manually.

Santara, *Annali di Ostetricia e Ginecologia*, 1915, published a paper dealing with fatty degeneration of the placenta. This paper is well

¹ Ann. de gynec. et de d'obst., 1911, 8, 595; 1912, 9, 486; 1912, 9, 539.

² Arch. mens. d'Obst. et de Gynec., 1913, 4, 145, tr. 17; International Congress of Medicine, 1914, sec. 8, p. 25.

illustrated with microscopic sections. He raises the question of the possible nutritive value of fat in the placenta for the fetus during pregnancy and likens the placental fat to that which is seen on dissecting the mammary gland.

Placenta Previa. PLACENTA PREVIA AND EXTERNAL VERSION. Zalewski¹ reports 192 cases of placenta previa in the Breslau Clinic. Three-fourths of these patients could be described as working women. Their ages varied from sixteen to fifty. Of these, 178, or 92.7 per cent., were multiparæ, and 14, or 7.3 per cent., were primiparæ. In this clinic the frequency of placenta previa was 1 in 80 or 90 births.

The danger of placenta previa is from the hemorrhage and liability to infection, and, unfortunately, most of these cases go on to the later months of pregnancy. In these 192, there were but 7 abortions, or 3.4 per cent.

As regards the children in the 192, 48 per cent., or 92, were born at full term; 33 per cent., or 63, between the thirty-fourth and thirty-ninth week; and 19 per cent., or 37, before the thirty-fourth week. In view of these facts, the recommendation for the induction of labor loses its force.

The mortality of placenta previa, it is thought, ranges from 15 to 20 per cent. for the mother.

Among these cases were 57 of central placenta previa, over one-half of whom had suffered severe and dangerous hemorrhage. There were 71 of partial placenta previa; 56 of lateral, and 8 of marginal.

The methods of treatment employed embraced practically all of the procedures now in use. Forcible dilatation and extraction is considered exceedingly dangerous and to be avoided. Ligation of the uterine arteries through the vagina is of doubtful value. The use of the dilating bag and the iodoform gauze tampon are also described. There is no question of the fact that the gauze tampon is a fruitful source of infection and should be avoided, and the writer's experience is in support of this statement. Rupture of the membranes was employed in 40 cases, with but 19 spontaneous births. Experience shows that artificial delivery in placenta previa is always attended with increased danger, and, when this is necessary after rupture of the membranes, the circumstances are certainly not the most favorable.

Version followed by bringing down a foot and using the breech as a tampon has the advantage of a smaller mortality rate, about 5 per cent., for the mother, but a mortality rate of 50 per cent. and more for the children. In some clinics, the latter is reported as high as 84 to 90 per cent. The writer lays especial stress upon external version and employed this method in 45 cases. In 53 he used the dilating bag. Experience shows that the use of the latter rarely results in spontaneous

¹ Archiv f. Gynäk., 1915, Band cxi, Heft 1.

expulsion, but the child must ultimately be delivered by version and extraction. The results of both external version and the use of the elastic bag gave a high fetal mortality, especially in central placenta previa. The advantage of external version lies in the fact that the hand is not introduced within the birth canal, and the danger of infection is thus considerably lessened. The writer analyzed the statistics of his series of cases as regards the morbidity and mortality for mother and child by the various methods of vaginal delivery.

He credits delivery by section in these cases to American and Italian obstetricians, and believes that this method of treatment, which he seems reluctant to accept, has found some followers in Germany. He would limit section to those cases of central placenta previa in old primiparae where the birth canal is rigid and the parents are especially desirous of saving the life of the child and willing to take considerable risk on the part of the mother.

CENTRAL PLACENTA PREVIA. Flint,¹ before the New York Obstetrical Society, describes his experience with placenta previa at the Bellevue Hospital. These cases are often seen at home. Should hemorrhage be present when the ambulance surgeon first sees the case, or when the patient is admitted to the hospital, the cervix and vagina are firmly tamponed with iodoform gauze. He treats central placenta previa, whenever possible, by vaginal delivery followed by an intra-uterine douche containing alcohol, after the uterus has been completely emptied, and packing of the uterus to prevent postpartum hemorrhage. In a very considerable service he has not yet encountered a case suitable for abdominal Cesarean section.

At the same meeting, Caldwell reported 5 cases of central placenta previa occurring in Flint's service at Bellevue Hospital. These cases were treated by packing with iodoform gauze, delivery by version and extraction, the complete removal of the placenta, irrigation with 50 per cent. alcohol and packing with gauze. One of the 5 mothers died from uremic coma on the ninth day. The other 4 made good recoveries. All the children were premature. Two were dead, 1 macerated; 2 others dying within the first two days, and only 1 child lived for several days. As regards the frequency, at the Manhattan Maternity in 11,435 confinements there were 67 placenta previas; of these, 13 were central and but 3 of these children survived.

TREATMENT OF PLACENTA PREVIA. Stratz² has treated 176 cases of placenta previa, many of these in private practice. Among these there were 63 cases in which all that was necessary was a rupture of the membranes, and the pressure of the presenting part stopped the hemorrhage.

The remaining 110 were treated by combined version, the bringing

¹ American Journal of Obstetrics, June, 1915.

² Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvi, Heft 3.

down of a foot and leg without extraction. Stratz makes no distinction in treatment between central and lateral placenta previa. In these 110 cases, on vaginal examination he could find only placental tissue.

But 1 mother died in this series of 173; a mortality of 0.6 per cent. This patient collapsed half an hour after delivery and died. An autopsy showed a vein the size of a finger above the contraction ring from which bleeding had occurred. The sudden death seemed to indicate pulmonary embolus.

In 50 cases there was slight rise of temperature after labor; in 3, considerable fever, 2 from purulent endometritis, and 1 from pelvic abscess. The 3 cases having high fever recovered.

Of the children, 77 were stillborn and 20 had been dead for some time before delivery. The total mortality was 45 per cent. It is evident that this method of treatment caused a comparatively low maternal mortality with a high fetal mortality.

Stratz gives the statistics of placenta previa in Holland for 1915, collected from the various clinics, as 881 cases, with a maternal mortality of 7 per cent., and fetal mortality of 43 per cent. Among these is a group of 236 cases treated by combined version without extraction, with a maternal mortality of 2.7 per cent., and fetal mortality of 68 per cent.

He has treated 6 cases by section, losing no mother or child. He believes that, in some instances, this is the best method of treatment. He does not accept the use of the dilating bag or tampon as valuable. As regards the frequency of embolism in placenta previa, he has found but 4 cases in 900, and in 230 cases treated by combined version there were but 2 cases of embolism.

The result of his experience in treatment is as follows: For very moderate bleeding, absolute rest, narcotics, and in no case the use of the tampon.

Where bleeding is severe, combined version and bringing down of a foot, keep the patient under control but do not pull strongly upon the foot, and, if possible, make the patient expel the child to the shoulders. Extraction of the child as slowly and carefully as possible. With many others, he recognizes the fact that the greatest danger consists in rapid and forcible extraction after version.

THE STUDY OF THE FETAL HEART SOUNDS IN PLACENTA PREVIA. Baughman¹ has found that information of value may be obtained by careful study of the fetal heart sounds in cases of placenta previa. After the location of the fetus has been determined by palpation, the obstetrician should examine the fetal heart at the point on the abdomen of the woman nearest the middle of the back or the chest of the fetus. Taking the normal heart of the child as beating from 120 to 140 times to the

¹ American Journal of Obstetrics, February, 1915.

minute, a heart beat of 100 or 160 would indicate a serious complication on the part of the fetus. It is also valuable to observe the character of the fetal heart and the strength of the muscular sound, its regularity or irregularity, and the presence or absence of the accentuation of the second sound.

THE TREATMENT OF PLACENTA PREVIA BY PRODUCING BREECH PRESENTATION. Hannes¹ compares in the clinic of Küstner at Breslau the results reported by Zalewski, 46.5 per cent. living children in placenta previa after external version, with the results obtained by the use of the dilating bag. The writer believes that the introduction of the bag against the placenta or through it will give far better results.

A CASE OF CERVICAL PLACENTA. Trigal² describes a case of a patient, aged thirty-six years, who had had three labors, two abortions previously. At the second month in the pregnancy under consideration, she had a severe hemorrhage lasting in a greater or less degree for fourteen days, and followed by an offensive discharge. Eight days before admission to the hospital, the bleeding returned. The physician called to the patient repeatedly used the tampon. Chills and fever followed, and, upon admission to the hospital, the patient was intensely anemic, the hemoglobin being 15 per cent. The temperature was 99.5° and the pulse 124, scarcely perceptible. The mucous membrane of the vagina and cervix were covered with exudate and were dark in color. There was a copious, bloody, foul discharge. The uterus was somewhat enlarged, soft, sensitive on pressure, and anteflexed. From the discharge were obtained diplococci, but no staphylococci or streptococci. The uterus was emptied under anesthesia through the vagina, and a considerable portion of very offensive, hard placental tissue was delivered through the cervix. The body of the uterus was contracted and empty. The patient had repeated chills and fever, and, accordingly, the abdomen was opened by a long incision. The uterus was amputated, the left ovary being allowed to remain. A gauze drain was carried through into the vagina.

Upon opening the uterus, it was found that the placenta had been adherent to the cervix, that infection had occurred, followed by hemorrhage and a foul necrotic process. The patient died seventeen days after operation, and, upon autopsy, a considerable lacerated surface was found in the cervix to which the placenta had originally been attached.

PLACENTA PREVIA, INFECTION, AND PURULENT PERITONITIS. Frank³ reports a case of a multipara who, three weeks after labor, had a severe postpartum hemorrhage for which curettement was done followed by six weeks' rest in bed. Menstruation did not return for some time.

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvii, Heft 2.

² Ibid.

³ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 2.

The patient's general health was good. Three years later she was taken with distress on the right side of the stomach, and the abdomen became so sensitive that she could not bear the pressure of her clothes. Her abdomen enlarged but she did not believe that she was pregnant, as menstruation had been absent for three years. The patient later felt life and a pregnancy of about five months was found to be present. Severe pain developed in the right side extending up to the right breast, and a little later was followed by the sudden discharge of amniotic liquid from the vagina, and symptoms of peritonitis developed. The patient was transferred to the hospital. Upon examination, the uterus was in tetanic contraction, the abdomen tense, the fundus beneath the border of the ribs. The fetal heart sounds were heard in the umbilicus. The patient was given opium.

Pains gradually developed and the patient vomited bile-colored material. A severe hemorrhage came on suddenly, and, as there was no dilatation of the cervix, section was performed.

Upon opening the abdomen, the peritoneal surface of the uterus was covered with pus and also the coils of the intestines. There was purulent fluid in Douglas's cul-de-sac. The intestines were adherent. The uterus was quickly opened and the child extracted. Its heart beat feebly but it could not be revived. The appendix was removed and also the body of the uterus, and the peritoneum sewed around the uterine stump. The abdominal incision was left open, but the peritoneum was brought together. The patient made a tedious recovery.

On examination of the specimen, it was found that there had been a placenta previa, and that the placenta had entirely separated. The peritonitis had resulted from infection at the site of the low attachment of the placenta by tamponing the uterus. One could trace the course of the infection from the cervix through the uterine walls.

PLACENTA PREVIA TREATED BY CESAREAN SECTION. Essen-Möller¹ reports 2 cases, primiparæ, treated by Cesarean section. The patients were aged seventeen and thirty-one years, and had suffered hemorrhage soon after admission to the hospital, although the cervix remained undilated. A placenta previa in both was central. The patients were at once delivered by section, both making uncomplicated recoveries. One of the children lived, the other died. These cases are cited to show the value of Cesarean section in central placenta previa when the operation is done as promptly as possible.

Willson² reported a case of a multipara who, during her pregnancy, had considerable pain and tenderness in the lower abdomen and very slight irregular hemorrhage. This was finally followed by a considerable hemorrhage, and the suspicion was confirmed by vaginal examination.

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

² American Journal of Obstetrics, April, 1915.

The examination set up a free bleeding and the vagina was immediately packed and the patient taken to a hospital. As the patient was not at term and the hemorrhage ceased, it was decided to wait in the interest of the child. Hemorrhage, however, continued at times and the patient's hemoglobin fell to 60 per cent.

At about thirty-five weeks' gestation, the patient was delivered by Cesarean section. The placenta was in the right lower posterior quadrant of the uterus and was a partial placenta previa. The patient made an uninterrupted recovery, leaving the hospital in less than three weeks. The child was cyanosed at delivery, but easily revived and apparently did well. Forty hours after birth it attempted to cry, became very cyanotic, and suddenly died. A partial autopsy failed to reveal the cause of death.

Management of the Placental Stage of Labor. Polak¹ studied the placental stage of labor in 2000 patients, of whom 1306 were attended in the out-patient service. Six hundred and ninety-four were admitted to the hospital, including the operative cases; 44 applications of forceps, 11 craniotomies; 23 versions; 3 pubiotomies; 29 Cesarean sections; 34 vaginal hysterotomies. In the 1306 cases attended by students and residents, there were no cases of postpartum hemorrhage. In the cases admitted to the hospital, most of them being operative cases, bleeding occurred three times. In 2 of these the uterus was tamponed successfully, and 1 was delivered by anterior vaginal hysterotomy. The other case of bleeding was after the delivery of twins.

The results obtained were far better than in a previous series when it was the routine practice to manipulate the fundus immediately after the delivery of the child. There were 18 cases of retained placenta, 5 at full term, 13 premature. Of the 5 full-term cases in which the placenta was retained more than two hours, 3 were delivered under anesthesia by expulsion. All had separated but were retained in the dilated lower uterine segment. In 1 case of myoma, the placenta was in the cornu of the uterus and was retained for thirty hours, as a tumor filled the interior of the womb. As the placenta in this case could not be expressed, and a tumor was present, abdominal hysterectomy and myomectomy were done and the placenta removed in this way. In 1 case the placenta was retained for ninety-six hours before separation occurred and expulsion was performed. The retention was caused by the retraction of the lower segment, which relaxed under anesthesia, permitting the delivery of the placenta.

In none of the cases of retention was there vaginal hemorrhage. This indicates that the presence of the placenta, attached or detached after birth of the child, really prevents hemorrhage.

In managing the placental stage, he has come to believe that the

¹ American Journal of Obstetrics, July, 1915.

placenta would come to separation spontaneously if the normal mechanism was allowed to pertain in the average case; that manipulation of the uterus before clinical evidences of separation were apparent would disturb this normal mechanism; the best way of guarding against postpartum hemorrhage consists in observing strictly the physiological processes; when manipulation is practised so that partial detachment occurs, bleeding is very apt to follow. He would not practise manual extraction except in cases of partial separation with hemorrhage. When the placenta is retained without hemorrhage, the umbilical cord should be cut off close to the cervix and the case watched until the signs of separation are apparent. The patient should then be put under surgical anesthesia and the placenta delivered by Credé's method. The invasion of the uterus through the vagina is fraught with danger from infection. If, on inspection, the placenta should not be found presenting at the internal os, intrapelvic delivery should be abandoned and delivery should be accomplished by suprapubic extraperitoneal hysterotomy. Should a case of genuine adhesion of the placenta be present requiring the removal of the placenta piecemeal, the placental site should be excised or hysterectomy should be practised.

Tuberculosis of the Placenta and Membranes. Lanz¹ refers to Schmorl's paper upon the subject of tuberculosis of the placenta. He has shown that tuberculous masses are found in the superficial surface of the villi in the intervillous spaces, and with an abundant development of round cells. He has also observed epithelial defects in the inner portion of the villi, with the penetration of tubercle bacilli into the villi themselves. Round-cell infiltration of the basal decidua has also been observed by Runge through the presence of bacilli and caseous material. Tuberculous lesions in the chorion have also been reported.

Lanz reports the case of a woman, aged twenty-eight years, who was greatly prostrated, with loud cough, and eight months previously had passed through her second normal labor and during the puerperal period was seized with pleurisy. She had been for two months in a sanatorium in the mountains, and was somewhat improved but afterward grew worse. She had been confined to her bed for eight days with fever, sweats, and dyspnea, and evidently had miliary tuberculosis, which was growing rapidly worse. The patient died soon after admission to hospital and autopsy was made ten hours later.

A pregnancy of four months was found, with tuberculous salpingitis and miliary tubercle in the uterine decidua and in the chorion. Upon examining the pregnant uterus microscopically, the placenta was found quite well developed, and abundant tubercular lesions were observed in the placenta and membranes. In the intervillous spaces there were masses of cells; in the fetal syncytium, bacilli and abundant deposit

¹ Archiv f. Gynäk., 1915, Band civ, Heft 2.

of tubercular nodules were observed; in the basal decidua there were necrotic portions of tissue and also caseous deposits throughout the placenta and membranes.

Upon examining the fetus, tubercle bacilli could not be recognized in the liver, lungs, and spleen. Material taken from the fetus and used for inoculating animals produced tubercular infection.

The interesting feature of Lanz's case lies in the fact that miliary tuberculosis of the decidua vera was present, which seemed to have been grounded upon a chronic caseous tuberculosis of the decidual membrane. The literature of the subject, which is not extensive, is reviewed, and quotations are made from some similar cases.

A Case of Angioma of the Placenta. Valeri¹ reports the case of a woman, aged twenty-four years, pregnant for the second time. Her previous medical history had not been eventful. Her first pregnancy proceeded naturally to the first labor which was spontaneous and with living child. During the second pregnancy, she had pain in the lumbar region, and there was some discharge of blood from the vagina. The second labor was spontaneous, a living, healthy, female child being born, weighing 3100 grams. The patient's puerperal period was practically normal.

Upon examining the umbilical cord, it was 50 cm. in length, with central insertion; the placenta measuring 21 x 25 cm. and weighing 1160 grams. Upon the superficial surface of the placenta there was an angiomatous tumor 8 x 5 cm. This tumor had a certain motility and seemed to be connected with the placenta by a vascular pedicle. Its bloodvessels communicated directly with those of the cord. Upon hardening and examining the tumor, it was found to be an angioma.

A similar case is reported by Ribbert,² of Bonn. Ribbert was collecting specimens of chorio-epithelioma and obtained the placenta in question from a colleague. Upon cutting through the placenta, the angiomatous tumor was discovered 9 cm. in diameter. It was near the insertion of the umbilical cord, was covered by a thin membrane from the chorion, and had several veins, one of which came directly from the umbilical cord. It seemed to be situated in the lower half of the placenta. There were superficial veins passing over the tumor and capillary vessels extended through its surface. Three zones could be distinguished, one having the structure of a capillary angioma, the middle zone of fibrillary material resembling connective tissue, and the third, or inner which seemed to partake very little of the angiomatous character of the tumor. While it is not known concerning the exact development of these tumors, they are referred to the vessels of the allantois.

¹ *Annali di Ostetricia*, 1915, No. 3.

² *Ztschr. f. Geburtsh. u. Gynäk.*, 1915, Band lxxvii, Heft 1.

Physiologically Active Substances Contained in the Placenta and in the Corpus Luteum. Frank and Rosenbloom¹ have tested physiologically the extracts of placenta and corpus luteum. The first experiments were made with an extract containing all the substances soluble in alcohol and ether. In a second series, the extract used was composed of substances extracted with acetone and also with those substances insoluble in acetone, while in the third series alcohol, ether, acetone, and chloroform were used in the preparation of extracts. For use, these extracts were emulsified with normal salt solution and olive oil. Rabbits were selected and a double lumbar oöphorectomy performed, a portion of the left uterine horn being removed and kept for additional control. It was known that the uteri of castrated rabbits of the same age and weight attain an approximately stable condition of atrophy in the course of four or five days, which remains at the same degree for several weeks. The castrated animals were injected with the extracts to be tested, and killed in from fourteen to twenty-eight days. Their uteri were compared with the uterine horn removed at the time of castration, the average condition of animals of given weight and the uterus as found at the time of death. Extracts were injected subcutaneously, the injections being given daily. In a few experiments the substances were given by mouth through a stomach-tube. In most instances the animals lost weight rapidly, but rarely died as the result of the injections. Animals injected for fourteen successive days with placental extract showed enormous hypertrophy of the uterus, whose surface was distinctly congested, resembling a uterus one or two hours postpartum. This condition was seen in rabbits deficient in weight, and which had not yet reached their full sectional development. Upon microscopic examination of the uteri, there was enormous increase in all the various tissues.

The results of injections of extract of corpus luteum were much less striking. In some instances there was marked hypertrophy, but only after a much greater number of injections had been made. It seems probable that the substances contained in the placenta and in the ovary are very similar in action. Extracts of corpus luteum in pregnant animals seemed more potent than from the non-pregnant. It is probable that the active substance is in the lipoid or is carried along the lipoids. At present the employment of these unpurified extracts for clinical purposes is entirely out of the question, because the toxicity of the mass of lipoids is considerable, as was shown by the emaciation of the animals. When the extracts were given by the mouth, a distinctly poisonous effect was sometimes observed.

Colle² has experimented with placental extract and contributes a paper upon the subject illustrated by tracings showing the effect of these

¹ Surgery, Gynecology and Obstetrics, November, 1915.

² *Annali di Ostetricia*, 1915, No. 4.

substances upon respiration and heart action. While the injection of these substances causes disturbance of the circulation and while death was observed to follow the injections, with some animals there was no evidence that thrombosis or embolism was produced by the injection.

Cova¹ experimented with alcoholic extract of the placenta by injecting it into animals. He found that it produced manifest hypertrophy of the mammary glands, the uterus and the vagina, corresponding to a period of pregnancy analogous to the development of the placenta. The ovary did not seem to be influenced by the injection.

Hermann² contributes an extensive paper recording the action of a substance obtained from the corpus luteum and from the placenta. His paper is fully illustrated, some of the illustrations being in colors. He finds that from both these bodies there can be isolated a chemical substance which is peculiar to these two bodies and is not produced by other organs in the human animal. When injected into warm-blooded animals, these bodies produce an extraordinary growth and development in the genital organs. The effect seems to be to produce a symmetrical anatomical development of the entire genital tract. The entire effect resembles most closely that produced in the healthy animal by the beginning development of normal gestation.

The Relative Insufficiency of the Placenta. Ridella³ draws attention to what he describes as insufficiency of the placenta as a cause of fetal death. He illustrates his paper with some excellent colored microscopic drawings showing proliferation of the cells of Langhans's layer, the development of an abundant and fibrinous substance in the villi, the basal decidua invaded by polynuclear cells, probably of fetal nature, the change into fibrinous masses of cells in the intervillous spaces, the proliferation of the syncytium, characteristic lesions of the villi, the excessive growth of decidua in the intervillous spaces and an active proliferation of syncytium with the transformation of stroma into cellular masses.

He cites the lesions seen in the placenta in albuminuria and in syphilis, in which large masses of fibrinous material take the place of the cellular placental elements.

THE PUERPERAL PERIOD.

Acute Inversion of the Uterus. Jaschke⁴ describes the case of a multipara, aged twenty-nine years, who had a forceps delivery in one of her preceding births and two normal confinements. On each occasion the delivery of the placenta presented some abnormality, and there was the history of adherent placenta and manual delivery. In her last puerperal

¹ *Annali di Ostetricia*, 1915, No. 9.

² *Monatsschr. f. Geburtsh. u. Gynäk.*, 1915, Band xli, Heft 1.

³ *Annali di Ostetricia*, 1915, No. 1.

⁴ *Zentralbl. f. Gynäk.*, 1915, No. 32.

period, the patient on the twelfth day had a severe hemorrhage whose cause she did not know.

When she presented herself at the clinic, it was found that she had varicose and partially thrombosed veins on the right thigh at its lower portion, and that the whole of the right leg was considerably enlarged.

Spontaneous labor developed at term and proceeded promptly. Soon after the birth of the child, the uterus relaxed and hemorrhage occurred, and, although secacornin was given and massage and grasping of the uterus were used, the uterus would not remain contracted. In less than ten minutes the patient had lost 900 grams of blood. The effort was made to deliver the placenta by Credé's method but this failed, and the patient was then anesthetized and further trial of Credé's method was equally unsuccessful. As there was still some hemorrhage, the placenta was removed by the introduction of the hand. This proved to be very difficult because the relaxed uterus was unusually thin and it was very difficult to distinctly recognize the placenta. A portion of it was at the fundus, but the greater part on the anterior uterine wall. During the operation, the assistant changed the grasp of his hand, and, when the hand was removed from the uterus, although no traction was made on the placenta, the uterus inverted.

The hemorrhage immediately ceased. The patient's radial pulse could not be felt, the carotid pulse was very rapid and could not be counted; the patient was pale, in cold sweats, with hurried breathing and in severe anemia. There was no evidence of profound shock.

Tincture of iodine was at once applied to the interior of the womb at the vulva and the uterus was replaced without especial difficulty. When the hand was removed from the womb, there was a tendency to repeat the inversion. The uterus was then carried up above the pelvic brim by the introduction of the hand and firmly tamponed with gauze; also the vagina was tamponed with gauze. A firm compress and a bandage were applied to the abdomen. Saline transfusion was not given, but 2 c.c. of camphor was injected. At the end of the operation, the radial pulse could be felt 160 to 180. As a prophylactic, 0.02 methylene blue silver was given daily by intramuscular injection for six days. The right lower extremity was elevated and the patient was kept quiet. On the third day thrombosis of the right lower extremity at the saphenous opening developed which did not, however, attack the femoral vein. There was no extension of the thrombosis. The patient made a good recovery and was discharged from hospital on the twenty-fourth day.

The interesting points concerning the case are the presence of an adherent placenta, the extraordinarily thin and relaxed uterus, the failure to prevent hemorrhage without manual extraction, and the fact that, although the symptoms of very severe anemia were present, the patient was not (so the writer says) as greatly shocked as was the

attending obstetrician! It is thought that possibly the use of an anesthetic accounted for the absence of severe shock.

Puerperal Anemia. Biglioli¹ reports a number of cases of anemia in the puerperal state in which examination of the blood showed that the red blood corpuscles were greatly diminished, their number varying from 500,000 to less than 2,000,000. The leukocytes ranged from 7000 to 11,000; the hemoglobin (according to Fleischl) from 10 to 30. He believes that in this condition essential changes develop in those viscera which have most to do with the formation and the maintenance of normal blood. He describes proliferation of cells and the formation of abnormal elements in the blood, as demonstrable through sections of various organs.

Many of these cases recover if taken in the early stage of the disease.

The Treatment of Puerperal Streptococcic Infection by Serum. Pezzini² has used Tavel's antistreptococcic serum in cases of puerperal sepsis in which the streptococcus predominated. He believes that, if the anti-streptococcic serum be given promptly after the commencement of an infection, it tends to shorten its duration and modify its severity. The favorable influence of the treatment can usually be seen in from twenty-four to forty-eight hours. In cases in which the important viscera are in good condition, and especially when the kidneys are sound, injurious after-effects are not seen. It is useful to ascertain the particular variety of streptococcus present, although this is not of the greatest significance. Evidences of intolerance, as indicated by headache, pains in the joints, and erythema, do not contraindicate its use.

Spontaneous Puerperal Infection. Bollag³ states that in the clinic at Basel in 23,516 cases of labor this is the first mortality from sepsis in which an external source of the infection could not be found. In 27 other cases, the source of infection was evidently without the patient's body.

The patient was a multipara, aged thirty-five years, giving a history of previously having had good general health. There had been five previous labors, with normal puerperal period, the children being well developed and sound. Up to the time of entering the hospital, the present pregnancy had been normal.

Upon examination, the patient was pale and weak. There was a systolic murmur at the apex of the heart, but the heart was not enlarged. The lungs were normal, the mammary glands well developed, and colostrum could be obtained on pressure. The abdominal wall was somewhat relaxed, and there were many old striæ. The pelvis was slightly contracted in its anteroposterior diameter, but no external examination was made, as the head of the child was in the pelvic cavity. The

¹ *Annali di Ostetricia*, 1915, No. 11.

² *Ibid.*, No. 3.

³ *Monatsschr. f. Geburtsh. u. Gynäk.*, 1915, Band xli, Heft 6.

patient stated that no vaginal examination had been made before she entered the hospital. She also stated that there had been no possible source of contamination of the genital tract for more than two months. This was corroborated by her husband.

Labor was normal, the child being somewhat premature, but fairly developed and fairly vigorous. The mother sustained no laceration. The placenta was normally delivered with very slight pressure, there was but moderate loss of blood, and the pulse and temperature before and after labor were normal.

On the evening of the fourth day, the temperature rose to 100 and the pulse was 100. The patient had some cough but no sputum, the lochial discharge was bloody but without abnormal odor. Ergotin was given to cause uterine contraction. Shortly afterward the patient had a severe chill. The abdomen was not distended nor painful on pressure; examination of the lungs showed a very slight dulness over the right upper lobe, with some fine rales and in some places slightly bronchial breathing. There was no symptom of thrombophlebitis. The patient gradually developed blood-tinged sputum. On consultation, there was found a diffuse acute bronchitis with râles at the apex and slight dulness. It was thought that the patient had a beginning pneumonia or possibly miliary tuberculosis. An examination of the blood showed no bacteria, but the patient's fever remained high. Methylene blue silver solution was injected daily. Thrombophlebitis of the right lower extremity developed, although the patient had practically no pain. A vaginal examination showed, on the right side, thrombosed veins which extended to the brim of the pelvis and above. The patient had repeated and severe chills, with very high temperature, and phlegmon developed which was incised without obtaining pus. Eye symptoms developed, but there was no acute process which could be detected. An examination of the blood taken from the cubital vein immediately after a chill revealed the presence of streptococci in long chains. The patient was apathetic, the bronchitis had entirely subsided, the heart murmur was present but not intense, and a diagnosis of ulcerative endocarditis was made. The right lower extremity remained swollen and painful on pressure. Unless disturbed, the patient complained of no pain. She took a small quantity of liquid food. Death ensued without the development of other conditions. A very thorough autopsy was made, and the process of thrombosis was traced through the iliac veins to the veins in the cervix and broad ligaments. No pus was found in the thrombi. Streptococci were isolated in blood taken from the heart and from the spleen. The virulence of these germs may be appreciated from the fact that although rubber gloves were worn by those manipulating the tissues, several pustules developed on the hands. The autopsy showed no focus of infection from which the streptococci could have travelled to the genital organs.

Unquestionably, the cause of the general infection was a thrombosis detached from the internal genital organs. The possibility of such an occurrence of spontaneous sepsis is variously stated as 1 in 10,000 to 1 in 20,000. In view of the thorough study which was made of the case, it must remain in the literature as a remarkable example of spontaneous infection.

Placental Bacteriemia. Slemons¹ states that in 21 clinics, although careful autopsies were made and clinical data carefully taken, in 20 per cent. of the fatal cases the cause of death was not ascertained.

The writer calls attention to the fact that when the membranes rupture prematurely and labor is prolonged, especially if repeated vaginal examinations have been made, bacterial invasion of the placental site may occur. This is a dangerous complication for the fetus.

The writer has studied 500 consecutive confinements with regard to this phenomenon and found in the series that, including infants over 40 cm. long, the mortality was 5.4 per cent. (27 cases). The infant was stillborn in 21; died on the second day in 3; in the fourth day in 2; and on the ninth in 1 case. An autopsy was performed in each instance. The causes of death were syphilis in 7; birth injury in 6; premature separation of the placenta in 4; placental bacteriemia in 3; congenital heart lesion in 2; enlarged thymus in 1; toxemia of pregnancy in 1, and undetermined in 3. The percentage of placental bacteriemia was 11.

In 62 cases in which labor lasted longer than twenty-four hours, there were 8 fetal deaths (13 per cent.). Three of these were due to placental bacteriemia. The mothers of these infants were not seriously ill, and were discharged in good condition at the end of two weeks. In the 3 cases organisms were demonstrated in the subamniotic connective tissue where it came in contact with the large fetal bloodvessels which cross the surface of the placenta. In 1 case it was possible to demonstrate bacteria in the act of penetrating the walls of these vessels. In every case the epithelium which covers the villi was intact; the capillaries within the villi were normal, and no bacteria were found on the surface or in the interior of the villi. The infection did not proceed from the maternal circulation, and did not pass through the walls of the villi. The bacteria entered the placenta by way of the amniotic membrane. Most frequently, in these cases, placental bacteriemia depends on the infection of the amniotic fluid, and this usually occurs because the membranes rupture prematurely, labor is prolonged, and repeated vaginal examinations have been made.

From the anatomy of pregnancy, the amniotic fluid may become infected by possibly three routes: Organisms may pass from the maternal circulation across the decidua, the chorion and the amnion,

¹ Journal of the American Medical Association, October 9, 1915.

or they may travel from the peritoneal cavity down the Fallopian tubes, or they may ascend from the vagina through the cervical canal. The last is of direct practical significance. It is, however, possible that hematogenous infection in the amniotic fluid may be the result of a maternal septicemia, and also that, in acute appendicitis during pregnancy, the germs causing this condition may find their way down one of the Fallopian tubes.

While some have thought that bacterial invasion of the amniotic cavity occurred while the membranes were intact, the evidence in favor of this is not conclusive, and it has never been confirmed by bacteriological examination. Foul-smelling, decomposed amniotic fluid has escaped when the membranes ruptured, but this must have been due to bacterial putrefaction. In the absence of cultures, it remains to be proved that the unruptured membranes are not an effectual barrier against the passage of bacteria from the vagina to the amniotic cavity.

Although many bacteria may invade the amniotic fluid, the streptococcus has been the predominating organism in placental bacteriemia. Frequently colon bacilli are associated. In some cases a gas bacillus has been obtained from blood cultures. It seems also beyond doubt that the mother becomes infected in these cases. This has been demonstrated by making cultures from the mother's blood and sections of the placenta. If blood cultures be taken the day after delivery in a patient who has had fever during labor, a prognosis can be obtained. If the cultures are negative, the prognosis is favorable; if positive, the prognosis becomes grave. Blood cultures at the time of labor have no prognostic value. So many patients have fever during labor who have none afterward. The puerperal morbidity in patients having fever during labor is about 63 per cent.; the puerperal mortality 6.2 per cent. The outlook from intrapartum fever is more serious for the infant than for the mother. The mortality ranges from 18 to 61 per cent.

It seems established that intrapartum infection must be regarded as one cause of fetal death and that the umbilical vessels may be the path of infection.

Bed-sores Developing during the Puerperal Period. Kottmaier¹ describes 4 cases of puerperal women in whom bed-sores developed. His first was a primipara, aged twenty-six years, fairly vigorous, with a slightly contracted pelvis, and spontaneous birth. Two days after labor, in the region of the posterosuperior spine of the ileum, there developed a bluish-red area, which gradually disappeared in five days without having actually broken down or produced an ulcerating surface. This patient had sustained a laceration in labor, which had been repaired, for which she was obliged to remain quiet for twelve days. But this seemed scarcely sufficient cause for the development of the bed-sores.

¹ Zentralbl. f. Gynäk., 1915, No. 39.

Case second was a weak primipara, a deficient in size and development, and with flat, rachitic pelvis, a pulmonary lesion and a damaged heart. Labor was spontaneous, but during the last stage the patient became very much excited. The patient also had urticaria. On the second day of the puerperal period an area of reddish-blue appearance was found in the region of the posterosuperior spine of the ilium and this area proceeded to loss of epithelium and to the beginning of a typical bed-sore. This patient also had gonorrheal endometritis and was obliged to remain quiet for three weeks. Under very simple treatment, the bed-sore healed.

His third case was a vigorous primipara with a generally contracted pelvis, spontaneous labor and laceration of the perineum. On the second day after labor vesicovaginal fistula developed, but this gradually closed in the five succeeding days with the use of a permanent catheter. On the second day, a semireddish area appeared, and on the next day superficial epithelium disappeared, demarcation occurred, and on the sixth day a necrotic portion of tissue was discharged, leaving a bed-sore. This gradually healed, but it is also significant to observe that on the second day the patient had left-sided herpes labialis.

The fourth patient was a vigorous primipara with increased patellar and foot reflexes, and a decided tendency to dermographismus. The pelvis was contracted, but labor was spontaneous. A characteristic reddish area appeared over the sacrum on the day following labor. This was very slightly painful but during the next two days necrosis occurred, and the characteristic bed-sore developed, which required three weeks' treatment for its healing.

In the effort to explain these cases, the writer considers them primarily of toxic origin and that they point to some derangement in the internal secretions. There is also a certain angioneurotic element resulting from the excessively strong uterine contractions developing during labor. It should be noted that each of these patients was a primipara and each had a contracted pelvis, and that in each case vigorous uterine contractions succeeded in forcing the birth of a living child. The irritation and expenditure of energy by the mother's nervous system far exceeded that resulting from the delivery under anesthesia by some obstetric operation. Had these patients been delivered by forceps, pubiotomy or section, it is doubtful if bed-sores would have developed.

The Origin of the Stimulus of the Mammary Secretion. Zuloaga¹ reports a case of a patient to whom he was called because she had intense metrorrhagia. A diagnosis of abortion at about four months was made and a gauze tampon was used. Vigorous uterine contractions were present. On removing the gauze, a cotyledon of placenta was removed with it. This seemed to be a portion of a placenta at term, and apparently had become attached at the time of labor and had continued to live.

¹ Archives Mensuelle d'Obstétrique, September, 1915.

On the third day after this occurrence, there was elevation of pulse and temperature and secretion of milk began. So great was the distention of the breasts that motion of the arms was painful, and this secretion persisted for over twenty hours. On questioning the patient, she stated that five months before she had passed through her first confinement and the midwife had delivered the placenta manually.

A second case was that of a multipara, pregnant about six months. At the third month, she had vomiting and disturbances incident to pregnancy. Three months after this, she had symptoms of abortion, and expulsion of a fetus at about three months. The fetus was mummified, and the placenta corresponded in size to five months. This placenta had the anatomical characteristics of a subchorial hematoma. The patient's recovery was normal so far as fever was concerned, but two days afterward the secretion of milk developed and persisted for a short time.

A third case was that of a multipara who believed herself pregnant seven months, when she ceased to feel active movements of the child. Two days after this she suddenly developed lactation. The secretion of milk was fully developed, but less abundant than after preceding confinements and disappeared in about six days. A month later the patient expelled a macerated fetus of about seven months' development accompanied by its placenta. The latter presented certain areas of coagulation necrosis. Following this, the secretion of milk gradually disappeared.

From these cases, and his further investigation of the subject, the writer believes that a hormone which produces a secretion of milk is probably formed by the glands of the myometrium. It is doubtful whether the fetus has any influence upon the secretion of the mammary glands. The internal secretion of these myometrial glands goes during pregnancy to the placenta, thence to the fetus, determining in that the so-called crisis of the newborn described by Bar. It is only after the interruption of the direct connection of the placenta with the uterus that the product of the secretion of the myometrial glands passes into the blood of the mother and thus produces stimulation of the mammary glands. Involution of the uterus favors the passage of the hormone into the maternal blood. In the fetus, as in the placenta and in the uterine tissue, especially that portion corresponding to the myometrial gland, one finds in greater or lesser quantity the hormone capable of determining mammary secretion. This fact explains the results obtained by some investigators who have experimented with uterine extract or extract of the placenta and fetus.

The Pathology of Lactation. Lindig¹ discusses the remarkable change which takes place in the mammary glands following the birth of a fetus.

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvi, Heft 3.

The fact that the mammary glands may secrete in those women who have never been pregnant has long been known and has frequently been demonstrated. The writer quotes the following case: A patient, aged thirty-seven years, unmarried and who had never conceived, remained in the clinic for three months suffering from tuberculosis of the bladder. She received treatment with tuberculin after her discharge to her home and until her return to the hospital. On one occasion she reported that on the second day after her last menstruation the right breast contained fluid. On examination, the secretion of the breast could be pressed out drop by drop, but there was no change found on examining the genital organs. Both breasts were poorly developed and there was no especial difference between the right and the left. The patient was examined seven times, during the week, and on two occasions fluid was found in the left breast. The secretion was yellowish white, and a microscopic examination showed fat crystals of various sizes, epithelium, and leukocytes, but no colostrum.

He also reports the case of a patient, aged thirty years, with a diagnosis of tuberculosis of both Fallopian tubes. The patient was treated with tuberculin injections. Both breasts were well developed and both excreted in drops a greenish, cloudy colored fluid, which, under the microscope, showed milk corpuscles and had the characteristics of milk. There was no evidence of colostrum. This secretion occurred during the interval between menstruations, and persisted for seven weeks. The tubercular process in the tubes had not yet healed.

A third case of tuberculosis of the left Fallopian tube and bowel had a secretion in the breasts, which, upon microscopic examination, was recognized as colostrum. This secretion lasted for more than four weeks while under observation. A fourth case of tuberculosis of the right kidney treated by extirpation was reported, in which the same phenomena in the breasts were observed. A fifth case of tuberculosis of the kidney was treated by tuberculin, and had the same mammary secretion already described. Also, another case of tuberculosis of the kidney presented the same appearance. After being two weeks under observation, symptoms of appendicitis developed and the appendix was removed. In the seventh case, a diagnosis of tuberculosis of the peritoneum was made, and the patient was treated with tuberculin. There was a secretion in the breasts, which, on microscopic examination, resembled colostrum. In the eighth patient, there was beginning tuberculosis of both apices. The breasts were well developed and showed the secretion already described. In the ninth patient there had been total extirpation of the uterus for myomata, with both Fallopian tubes. There was a secretion of colostrum. The same phenomena appeared in the tenth case. The eleventh was that of retroversion of the uterus with tuberculosis at the apex of one lung, treated by operation. The breasts had the same secretion already described. In the remain-

ing of the 20 cases there was carcinoma in 1, prolapse in another, carcinoma of the colon in another, of the body of the uterus, of the cervix, vaginal portion of the cervix, peritoneum and myomatous tumors. These were variously treated in accordance with the needs of the individual patient, but, in all, the breasts presented the characteristic secretion. The writer calls attention to the fact that observations previously reported had been made upon patients older than the cases cited, most of whom had borne children. In his patients, the question of pregnancy did not enter, nor was there any history that the patient had ever been pregnant. The mammary glands had never been subjected to physiological stimulation, nor has there been any attempt at a normal lactation.

The microscopic study in these cases showed that the typical colostrum was not always present. There were, however, cells from the acini of the breasts, leukocytes, and the products of disintegration of cells. The quantity of secretion was not sufficient to obtain a chemical and physical analysis, but in a number of the cases there was no colostrum present, but fully formed milk was secreted.

He also reports the case of a patient, aged twenty-two years, unmarried, who had been previously in good health. The patient developed pleuritis, and had cough and expectoration for almost a year. She observed at various times, always at the height of the period between menstruations, that is, fourteen days before the beginning of the next period, that in the left breast there were sensations of pain and distress. A pleuritic process was also upon the left side, and upon examination tuberculosis of the apex of the left lung was shown to be present. The left breast was considerably larger than the right, the parenchyma evidently enlarged, the areola about the nipple pigmented. Gentle pressure caused the expulsion of a fluid closely resembling milk.

Sänger has called attention to mammary secretion following narcosis by ether in the performance of various operations upon the genital organs.

In Lindig's cases, there seemed to be very little change in the quantity of secretion. As regards the peculiar color observed, Gellhorn¹ ascribes this to various bacteria which are present. In Lindig's cases, the abnormality in color was a bluish-green or green.

It is interesting to observe the predominance of tuberculosis in these cases, being in the proportion of 9 out of 12, in 7 of which the genital organs were not affected by the tuberculous process. The intimate relation between disorders of the genital organs and tuberculosis has long since been established. Amenorrhea is no uncommon thing in these patients, and this may occur early in the history of the tubercular disease. Experiments made in the transplantation of tissue have

¹ Journal of the American Medical Association, 1915, lvii.

sometimes resulted in the reappearance of menstruation without special influence upon the tubercular process.

Lindig also cites the case of a patient, aged thirty years, married, but having no pregnancy for four years. Menstruation was always regular. In the preceding summer, before coming under observation, she had nephritis in the right kidney, and, since then, pain at the beginning of the period on the right side, extending from the kidney around the back. At the periods there was headache and giddiness. There was a very well-marked secretion in the right breast. Attention is also called to the supposed antagonism between the Fallopian tubes and the mammary gland.

An interesting experience is reported in which a young woman, aged twenty-one years, had had the appendix removed two years before coming under observation. Since that operation, menstruation had been lacking, but every four weeks there were severe pains originating in the lower abdomen and extending into the back. This would seem to indicate that in some cases disturbance of any portion of the abdominal or pelvic viscera may be followed by the inhibition of the action of the ovaries.

It is known that hypertrophy of the breasts may be produced from various pathological conditions, as in the experiments reported by Jacske and Polano.

Observers have called attention to the similarity between the proteid material secreted by the breasts and certain proteid substances derived from the placenta and the fetus.

Absorption from the Genital Tract during the Puerperal Period. Ahlfeld¹ calls attention to the usual definition of absorption under the terms sapremia, sapropyemia, and toxemia. He believes that the term retention fever may properly express this phenomena. The question naturally arises whether such a case can occur without actual septic infection, and Ahlfeld quotes the so-called classic example of Walthard.² This was as follows: A woman, aged forty-two years, had her last parturition nineteen years previously, and was said to have had fever during the puerperal period. She suffered much from fixation and retroflexion of the uterus. She was treated by abdominal section, great difficulty being experienced in loosening the adhesions which bound down the uterus in its abnormal position. The patient died of peritonitis on the fifth day without fever. In the pus found in the abdomen were *Streptococcus pyogenes*, *Bacillus coli communis*, and the bacilli of malignant edema. The question naturally arises, under antiseptic precautions at operation, whence came these virulent bacilli? Had they remained in the tissue following the woman's puerperal sepsis

¹ *Ztschr. f. Geburtsh. u. Gynäk.*, 1915, Band lxxvi, Heft 3.

² *Ibid.*, 1902, Band xlvii, Heft 243.

nineteen years before, and were they aroused to activity by the loosening up of the adhesions?

Ahlfeld thinks it perfectly possible that in removing the uterus at the operation that some of its contents escaped into the peritoneal cavity and set up peritonitis. He doubts very much if this had anything to do with the sepsis of nineteen years previously. Ahlfeld quotes a case which he reported in *Deutsche medizinische Wochenschrift*, 1888, No. 27, p. 554. The patient, a primipara, had an uncomplicated labor and gave birth to a child weighing 2900 grams and 49.5 cm. long. Very soon after the expression of the placenta, the vulva was closed by a hematoma, which formed in the vaginal wall, as large as a child's head. At the termination of labor, the patient had a temperature of 97.5° F., pulse 64. The patient was undisturbed after labor. On the fifth day her temperature rose to 104° F., but subsided as soon as a daily vaginal douche was given. The hematoma did not become infected and in five weeks had diminished in size to that of a small hen's egg. This case seems to Ahlfeld to have been practically an experiment on the effects produced by the resorption of the lochial discharge without infection.

He believes that at no time in pregnancy, labor, or the puerperal period does the power of resorption in the vagina correspond to that in the uterus. Independently to the size of the uterine cavity resorption is hindered in the contracted uterus and furthered in the relaxed organ. Resorption reaches its highest point on the third, fourth, fifth, and sixth days of the puerperal period, and from the sixth day it grows less, and diminishes much more rapidly in proportion to the involution of the uterus. The most pronounced cases of resorption are found when the uterus fails to contract after the sixth day.

Ahlfeld draws attention to the fact that resorption is frequently converted into dangerous infection by wounds inflicted upon the lymph or bloodvessels by the instruments or fingers of the obstetrician.

Ligation of Veins in Puerperal Thrombophlebitis. Döderlein¹ calls attention to Bumm's classification of cases of thrombophlebitis complicating the puerperal period in two groups, which consists of cases in which the local disorder in the veins of the pelvis is accompanied by a rapidly developing and virulent form of general septic infection, characterized by high fever and the continued presence of streptococci in the blood. Patients having this condition soon die, and no form of treatment avails. The other class of cases are those in which the disease is much more mild, the elevation of temperature develops later in the puerperal period, fever is remittent in character, chills occur at lengthening intervals, and the blood at times is free from streptococci. In these cases, if one can shut off the septic foci from the circulation either by ligation or resection of the infected thrombi, the patient may

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 3.

recover. Döderlein showed such a case and illustrated the course of the temperature with relation to the bacterial findings by charts. The operation was done at that stage in the disease where the diagnosis of puerperal thrombophlebitis could be made with confidence because of the occurrence of repeated chills. The patient had not yet, however, become completely exhausted, and there were intervals in which the blood was found free from streptococci. Upon opening the abdomen, the spermatic plexus of veins on both sides was ligated, after excising the peritoneal and hypogastric veins. No chill developed after the operation, and the patient made a satisfactory recovery. He believes that ligation is better than extirpation of these veins, as the disturbance is much less and the danger of hemorrhage much less.

It might be said in criticism that this patient would probably have recovered without operation. Döderlein cites the case of a woman, who, after five months of severe illness, with chills and high fever, finally recovered. It is, however, very much better, if possible, to shorten so severe and prostrating an illness.

Puerperal Septic Infection Treated by Colon Bacillus Vaccine. At a meeting of the Obstetrical Society of Vienna, Werner¹ contributed a paper describing the results obtained by the intravenous injection of vaccine made from the colon bacillus in cases of puerperal septic infection. This treatment is analogous with that of Krauss who inaugurated the treatment of typhoid by vaccines from the colon bacillus. At first the vaccine employed was made from different strains of the colon bacillus, prepared with ether, but in later cases the vaccine was obtained from the Pathological Institute as prepared by Paltauf.

The injections were followed by a prompt and often lasting fall in temperature. A reaction followed the injection, and the patient often had a chill during the first half-hour, lasting from twenty to twenty-five minutes and a rise of temperature of from 1 to 2 degrees. This was followed by the descent of the temperature to normal or subnormal in from twelve to thirty-six hours. The corresponding change in pulse was observed, and the patients occasionally showed signs of collapse. The reaction was over in from one to two hours, and the patients yielded readily to stimulation.

Eleven cases were treated. They were cases of severe infection, having suffered from high fever for some time and had resisted the usual forms of treatment. The cases could be divided, in accordance with the effect upon the temperature, into three groups.

In the first, after the initial rise following the injection, the temperature fell to normal and there remained during the patient's convalescence. In the second group the characteristic rise of temperature developed, followed by absence of fever for a short time, only from two

¹ Zentralbl. f. Gynäk., 1915, No. 31.

to seven days; then came another rise of temperature lasting three or four days, apparently greatly depressing the patient, so that in 1 case death occurred during this period. In the third group no effect upon the temperature was produced by the injection, although repeated.

It was observed that the best results were obtained in those cases in which, on palpation, very little or no change of the tissue about the uterus could be found. In these cases the blood was sterile, but streptococci were present in the cervical secretion. In those cases in which the fall of temperature lasted but a few days, and, after a brief absence of fever, the temperature rose, pelvic exudates and pathological conditions in the adnexa could be found. In one of these cases there were streptococci in the blood. Chills were absent. In the cases in which no reaction followed the injection, there was a well-marked pyemia in one, with streptococci in the blood and metastasis in the lung; while in the other case there was a large pelvic abscess and streptococci in the blood. In the case in which the temperature at first fell after injection, but in two days again rose, the patient dying during this stage of the disease, there was pyemia and involvement of the lymphatics of the lower extremities.

When the results of the treatment are considered, it is found that in 72 per cent. of the cases, the influence of the treatment was good; while in 28 per cent. it produced no appreciable result. No death could be directly ascribed to the treatment. So far as pelvic conditions were concerned, it could not be observed that the injections produced any effect.

As regards the way in which the vaccines produced their effect, it is not reasonable to suppose that the injection is followed by the rapid production of antibodies; the time elapsing between the injection and the fall of temperature was too short to render this possible. It is also not an anaphylactic process because bacterial anaphylaxis is markedly specific, and such would give no reaction upon repeated injections. The most reasonable explanation seems to be that the vaccine produces an anti-anaphylactic condition. There is an irritation followed by a paresis of the heat centre. Attention has recently been called by Paltauf to the results obtained by Biedl, who, in typhoid, by injecting some albuminoid bodies, such as dutoero-albuminose, produced corresponding effects upon the temperature. The efficient agent is evidently not the bacteria but the albuminose bodies produced. The reaction seems to be an albuminoid reaction which resembles somewhat anaphylaxis but still differs markedly from it.

In discussion, Köhler reported a severe case of puerperal *septic infection treated by the intravenous injection of streptococcus vaccine*. At first, autogenous vaccines only, prepared from the blood of the patient, were used, but later a polyvalent vaccine from twenty bacterial strains was employed. The first doses were comparatively small, 2,000,000,

but later as high as 40,000,000 bacteria were given with good results. This treatment is usually reserved for severe cases, while mild cases are treated by less vigorous methods. A marked reaction followed the injection with many patients, a chill lasting about half an hour, rise in temperature, then falling to normal and occasionally to subnormal. The temperature usually rose on the day following or in a few days after the injection, and then another injection was given. One was sufficient in no case. The general results of the treatment were satisfactory.

Surgical Experience in Puerperal Sepsis. Schwyzer¹ reports the case of a patient who had been delivered four weeks before she was seen, in whom the right broad ligament was thickened, the right leg greatly swollen, and who had fever, 103° F. and above, for many days. The saphenous vein could be distinctly felt as thrombosed and there was redness over the vein. An incision into the vein brought pus. Fifteen small incisions were made in the leg liberating pus and thrombi. The patient was greatly benefited by drainage and immediately improved.

The second patient was a multipara who had fever four days after childbirth, reaching 106° F. and lasting about a week, during which time intra-uterine douches had been given. The abdomen was opened by an oblique incision over a mass in the region of the appendix, and an abscess was found, between the omentum, parietal peritoneum and outer wall of the cervix, containing several drams of pus. The appendix was not connected with the abscess, and was apparently normal. A second abscess resembling the first was found near the pelvic brim. The right cornu of the uterus was soft and fluctuating, and, upon incision, yielded a thick, yellow, non-odorous pus. The right tube was coiled behind the uterus. Upon opening, it was found thickened and reddened, especially where it was nearest the subcecal abscess. The left Fallopian tube showed no marked changes. The abdominal openings of the tubes were not closed, and evidently the infection had not originated in them. It was thought that infection of the peritoneum had occurred by direct migration through the uterine walls. The patient's recovery followed drainage. The third case had been attended by a midwife and was seen eight days after confinement; an abscess was found on the inner side of the abdominal wall, which could be traced to the left tube, infected, and infiltrated. The tube was removed, and the ovary, though large and covered with fibrin, was allowed to remain. Although drainage was employed, the patient died of septic meningitis five days after operation.

The writer also reports 2 cases of perforation of the uterus during labor. The first followed unskilful and violent attempts to produce version, after which it was found that the uterus had ruptured and

¹ Surgery, Gynecology and Obstetrics, April, 1915.

that the mother's intestines had prolapsed. The child was delivered by craniotomy. Abdominal section was performed and drainage used. The patient made a gradual recovery. The tear in the uterus was on the posterior surface, probably through the lower uterine segment. In the second case, after abdominal section, the area of the tear was inverted with two rows of interrupted sutures reinforced in place by a third. This patient also recovered. He also cites other cases in which drainage was followed by recovery. In one case hysterectomy was done, with free drainage through Douglas's cul-de-sac. The ovarian veins on the right side were found thrombosed, and were opened and allowed to drain through a stab wound in the abdominal wall. The writer also describes another case of pyosalpinx, with abscess and thrombophlebitis, in which one ovarian vein was drained and the other ligated. These cases illustrate what can be done by drainage only in desperate cases of sepsis. The reviewer has had excellent results in such cases, where the temperature does not fall promptly after the uterus is emptied, by incising the abdominal wall, loosening the adhesions between the uterus and the surrounding organs, putting into normal position the uterus, tubes, and ovaries, pushing upward the intestines, and then packing the pelvic space behind the uterus with 10 per cent. iodoform gauze, the end of which is brought out into the vagina behind the cervix. The abdominal wall is then closed, and the gauze removed gradually by traction through the vagina. No organ is removed by this procedure, but, should collections of pus be found, they should, of course, be opened and drained into the pelvis. The results have been exceedingly good.

The Temperature in Puerperal Septic Infection and the Part Played by Anaërobic Bacteria. Hüssy¹ calls attention to the familiar and important part played by streptococci in puerperal septic infection. In recent years, considerable stress has been laid upon the influence of the anaërobic bacteria in septic processes. In 1895, Krönig demonstrated anaërobic streptococci in the vaginæ of puerperal patients, and this observation was followed by that of Natvig and also the publication of Schopmüller. The latter for the first time demonstrated anaërobic streptococci in the blood of a woman who had septic infection following abortion. In 1912, Schopmüller demonstrated anaërobic streptococci to which he assigned an important part in puerperal septic infection. He believed that it is not infrequently present in these cases. Rosowsky found anaërobic streptococci in the vaginæ of young children and healthy women. This, and other similar discoveries, had an important bearing upon the question of auto-intoxication.

In diagnosing the presence of anaërobic bacteria, Burkhardt's method was followed. In all, 49 cases were submitted to investigation,

¹ Monatschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 4.

14 of mild, 16 of severe, and 19 of fatal, intoxication. In these patients the same findings were present in the lochial secretion and in the blood. Naturally, the latter are much the more important, but fatal cases are sometimes seen in which the blood remains sterile, while septic bacteria are isolated from the secretion of the vagina. In cases in which chills were present, the germs were discovered during the chill or very soon after. In 1 case in which the infective germ was anaërobic streptococcus, very few were found in the blood before death, and none at all in the blood after death. At autopsy, the blood was proved to be sterile.

The purpose of recognizing anaërobic bacteria is to determine whether one is dealing with a mild case of toxemia, or with sapremia lochiometra, or a genuine bacteriemia. In most cases, according to Hüssy, bacteriemia is present, but, with the means at our disposal at present, a positive diagnosis cannot always be made. Pure cultures of anaërobic bacteria could not be obtained from the lochial secretion but more often from the blood. Among these was a case of tetanus which had a rapid and violent course, where the diagnosis was made by the clinical phenomena. Bacteriological examination was negative, even when the site of the placenta was examined after the death of the patient. The case was one of probable criminal abortion. It is interesting to observe that anaërobic bacteria were present as frequently in fatal bacteriemia as were the hemolytic streptococci. It would, however, be a great error to suppose from this that the anaërobic germs are more dangerous than the others.

The writer discusses the literature of the subject, and quotes Goldschmidt as finding anaërobic bacteria in the lochial secretion in 14 per cent. of puerperal women independently of the existence of fever; Warnekross in 10 per cent. of febrile cases; Bondy in 11 per cent. of abortion; Worwowsky in 40 per cent. of healthy children and women. Several observers report infection with the *Bacillus emphysematosis*.

Infection with the anaërobic tetanus bacillus is comparatively rare. Spiegel collected but 66 cases, and has observed but 4 himself. A case reported by Hüssy, in 1903, was Case No. 67 in the list. One could distinguish endometritic localization, vaginal and peritoneal localization, and endometritic and vaginal localization of this form of infection. In giving a prognosis, one must consider the length of time of incubation and the time of the beginning and the mode of development of the convulsions. It is difficult to ascertain the first, but, in the case described by the writer, death ensued within thirty-six hours from the first symptom.

As regards the treatment of puerperal tetanus, it is the same as that of tetanus in any other class of patients. In the clinic at Basel, in twenty-two years there had been but 2 cases of puerperal tetanus. As regards the prognosis, it is thought to be somewhat better than that of infection with the *Streptococcus putridus*.

The writer concludes his studies upon this question by stating that the bacteriological examination for anaërobic bacteria is of value and importance in recognizing the cause of puerperal septic infection. Certain anaërobic bacteria are especially virulent, as the tetanus bacillus, the anaërobic streptococcus and staphylococcus, and the *Bacillus emphysematosis*. Fortunately for these patients, these germs are rarely present. The anaërobic bacterium, which is often found and which produces gases, is fortunately not a very dangerous germ. Mixed infections with this and aërobic germs of whatever sort, either in the lochial secretion or in the blood, are not necessarily of grave import. Mixed infections of this sort in the blood are rarely seen. The technic of study necessary in anaërobic germs is simple and readily carried out. If one desires to classify them, he may adopt the method of Massini or of Lindermann.

The Prognosis of Puerperal Fever as Determined by Bacteriological and Histological Examination. In the *Archiv f. Gynäkologie*, 1915, Band civ, Heft 2, Warnekross contributes a paper upon this subject, giving the results of his observations in Bumm's Clinic in Berlin.

He calls attention to the importance of a systematic bacteriological examination of the blood in studying the development and progress of puerperal septic infection. By this and other means, one can divide these cases into infection which is localized or limited, and that which is general and without localization. While bacteriological examination can give much valuable information, one must also have recourse to the differential study of the cause, and this may arouse conditions which may produce a temporary bacteriemia. In studying this subject, one must not forget the important part played by the uteroplacental circulation and this can best be studied by histological methods.

As regards the technic of blood examinations, Schopmüller's method was essentially followed. A relatively large quantity of blood (20 to 30 c.c.) was taken. For puncturing a vein, Leur's syringe was employed and every precaution taken to maintain strict asepsis. After cleaning the skin of the arm over the vein with ether, 20 c.c. of blood was removed. The agar culture material must remain for at least fifteen minutes in water at 40° C., until the whole of the material has come to 42° C. When this material is cooled, the process can be hastened somewhat by employing cold water. The agar impregnated with the blood remains in the cabinet used for the purpose for four days. This time is necessary to prove that the blood is or is not sterile. When, during this time, no colonies are observed, the material is subjected to further examination.

Another interesting point in taking blood for bacterial examination is the time at which the blood is obtained. It is preferable to obtain it when the temperature is rising or at the beginning of a chill. Cases are sometimes seen in which the blood remains sterile, because it has

been taken a short time after a chill when the antibodies have been successful in destroying the germs. Hanim has recently reported the case of a woman suffering with septic infection from the colon bacillus, where it was not possible to obtain the customary reaction during the chill but at the time when the bacteria were entering the blood. Although, in his case, pure cultures of colon bacilli were obtained from many organs, the blood taken during the chill remained sterile. The destruction of bacteria at this time seems to have been so rapid that the test failed. The test would probably have been successful if it had been made when the temperature began to rise shortly before the occurrence of the chill. The autopsy showed without doubt that bacteria had been present in the blood. Although such cases are unusual, they demonstrate the possibility of the rapid destruction of bacteria.

Warnekross first considers cases of abortion complicated by fever, and these he divides into two classes: (1) the acute or mechanical bacteriemias, in which the bacteria were found in the circulating blood at only a given time; and (2) those more lasting or spontaneous bacteriemias in which, in every examination, bacteria were present in varying numbers. The first is observed when, after abortion, fever lasts but a short time, disappearing usually when the uterus is completely emptied. In these cases the source of the bacteria is probably in the placenta, or in the muscle of the uterus and in the tissues about the uterine sinuses. It is interesting to observe that, in these cases, the bacteria in the blood remained the same after the uterus had been emptied as before. Anatomical structures of the uterine wall had undergone changes which had virtually shut off the uterine cavity from the maternal circulation.

In cases of abortion complicated by acute fever which have been classified as comparative bacteremia of mechanical origin, 100 observations were made. In 32 streptococci were found in the lochial secretion, and in 22 they were hemolytic. The first blood test before the emptying of the uterus was in this series eighty-nine times positive. Of these, there were pure cultures in but 12, embracing streptococci, staphylococci, colon bacilli, *Bacillus emphysematosis* and bacteria. Among the tests made for mixed infection, streptococci were found twenty-five times, and in 10 with a somewhat doubtful hemolysis. Examination of the blood in all these cases was positive when the blood was taken at the time when the temperature was beginning to rise or when the chill had fully developed. During the time when the temperature was falling, the blood was sterile. The prognosis in these cases was made in accordance with the findings before and after the emptying of the uterus during the following days. During this time, the examination of the blood remained in 100 cases sterile. None of these patients died, and in most cases the temperature fell promptly after emptying the uterus. A localized endometritis developed, with a slight rise of temperature, and thrombophlebitic processes were not observed.

In the class of abortions in which chronic fever developed, known as resistant spontaneous bacteriemias, the prognosis is much more grave. One must differentiate as to whether a positive bacterial finding was first obtained in the puerperal period in the first few days after the emptying of the uterus when fever was not high, or at the beginning of the recovery of a case of abortion that was free from fever, or whether the case was one in which the emptying of the uterus occurred in a patient having persistent fever after abortion. The prognosis in these cases is distinctly unfavorable. If a patient is at first free from fever, with negative blood finding, but during a puerperal period it is observed that bacteria have entered the blood and that a primary virulent bacteremia has developed, the condition is grave. In a list of the bacteria found in these cases are the colon bacillus, various anaërobic and aërobic germs, the bacillus of tetanus, the pneumococcus, and Friedländer's bacillus of pneumonia. In 13 cases there were 10 infected by primarily virulent germs; eight times with streptococci and twice with staphylococci. In 5 cases the streptococci showed well-developed hemolysis, and in both cases the staphylococci gave the same finding. The patients were all in a very reduced condition, having suffered for days and weeks from fever and hemorrhage. Although various operations were done upon these patients, the results of the blood examination remained practically the same. These cases all terminated fatally. Where, however, the persistent blood infection was secondary, the prognosis was somewhat better. There were 3 of these patients, of whom 2 died, 1 two days after admission to hospital, 1 fifty hours later, while the third, who recovered, had a long and tedious illness. Among other points in the prognosis, it must be remembered that the rapid increase of pure cultures of the infective germs taken from the blood is a sign of great importance, and indicates a practically fatal issue. It is evidence that the patient has entirely lost the power of resistance. From his study, Warnekross believes that every case of abortion having fever should be treated by the complete emptying of the uterus as soon as possible. The quality of the bacteria found in the lochia in these cases is of value in prognosis, only if it be remembered that saprophytes can become secondarily virulent, as well as streptococci and staphylococci, which are always considered the most dangerous of germs. The prognosis should never be based upon the examination of material taken from the uterus alone. And, furthermore, the recognition of primarily virulent bacteria should not lead to the conservative treatment of these cases because of the danger that the resisting power of the organism may speedily be overcome.

It is acknowledged that, in pursuing active treatment, there is the possibility that thrombophlebitis may be set up, but this danger is remote. In none of his cases in which the blood, taken during a fall in temperature, was sterile, did pyemia develop. The explanation is

found in the anatomical conditions, namely, that the venous channels in the uterus aborting during the early months are small and very little disposed to the development of thrombosis.

The emptying of the uterus must naturally be done skilfully. If the gloved fingers suffice, this is best, or, if not, a large blunt curette should be used with gentleness and all rough interference absolutely avoided.

When cases complicated by fever in the puerperal period are studied, we must conclude that a positive finding of bacteria in the blood during the puerperal period must be taken as an unfavorable indication and denoting the further development of pathological processes. When there is no explanation for this condition in a wound in the genital tract or in some known complication, this finding must be taken to indicate a virulent bacterial process, showing that infective germs have made their way from the uterus into the circulation. Repeated bacterial studies indicate that streptococci and staphylococci are most often concerned in this process. The presence of other bacteria in pure culture depends upon some local anatomical or pathological circumstance, not inherent in the case. If, on repeated examination, this finding is present, the prognosis becomes correspondingly bad. If, during the puerperal period, on repeated examination, bacteria are found in the blood of the patient, whether it be a primary or secondarily virulent germ, the prognosis becomes correspondingly bad. It is true that the literature shows a few examples in which patients have recovered, although this condition was present. Such a result is exceedingly rare, and must not be expected as a common occurrence. When the blood remains free from bacteria, and exploration of the abdominal cavity is negative, the prognosis must be considered good. Such patients may become exhausted by prolonged suppuration of connective tissue, or by phlegmonous processes, and die from cachexia, but this is the exception and not the rule. It is of interest to consider whether recent studies in diagnosis shed any new light upon the general question of septic infection.

In cases of thrombophlebitis and puerperal pyemia the blood infection seems to be but temporary. There is an interval between the chills when the blood is free from bacteria. As in cases of abortion, the removal of infective débris is efficient, so, if the time be well chosen, the removal of an infected uterus and its infected vessels and the ligation of pelvic veins may be followed by a good result. While the operation of total extirpation and ligation is difficult, the writer believes that either emptying the uterus or its extirpation should be practised after the first chill which develops in the puerperal period. Nothing is to be gained by waiting, and the severity and the difficulty of the case are much increased. The writer quotes the mortality following extirpation of the uterus at 68 per cent., and that accompanying ligation of the veins at 62.7 per cent. In these statistics, cases in which infection

followed labor at term and abortion are not separated. When pyemia is diagnosticated, the effect produced by operation is much less. The operation will be done too late to have a radical effect.

The cases in which infection is limited to the lymphatic channels and produces virulent peritonitis in the puerperal period, without the entrance of bacteria into the blood, are more favorable in prognosis, and in these cases the prompt extirpation of the uterus and the drainage of collections of pus may be followed by good result. If the peritonitis is produced by streptococci in pure culture, any form of operation comes too late, for bacteria have passed the transverse colon and have made their way to the liver and under surface of the diaphragm. If, however, mixed cultures of bacteria are obtained in pus, or only those germs of secondary virulence, as in pyosalpinx or in necrotic processes, the prognosis for the patient is more favorable. Here a well-chosen operation may be followed by the patient's recovery. Bumm's statistics of cases of general peritonitis treated by operation in the puerperal period give a mortality of 64.6 per cent., but when the peritonitis was localized and the pus was encapsulated, the mortality was but 12 per cent. In these statistics, there was no distinction made between cases of sepsis following abortion and after birth at term. The writer thinks that the mortality of general peritonitis exceeds 64 per cent. He draws the general conclusion that a case that has had abortion should be treated by emptying the uterus as soon as the fever develops. Should the patient's temperature rise during labor, the uterus should be emptied as soon as possible. When fever develops in the puerperal period, the combined histological and bacteriological examination should be made. Processes which are intoxication only, with the products of necrosis, must be recognized as comparatively harmless, and examination of the blood will often enable one to distinguish between localized and general infections. The importance of bacteriological study of the blood in these cases cannot be overestimated, because it affords a positive means of diagnosis and is one of the most reliable methods for making a prognosis.

The Mortality from Puerperal Septic Infection. In the *Zeitschrift f. Geburtshülfe und Gynäkologie*, 1915, Band lxxvii, Heft 3, a very interesting and comprehensive paper on the mortality from puerperal septic infection is contributed by Beuss, from von Herff's Clinic at Basel. The writer refers to van 'Tussenbroeck's statistics of puerperal septic mortality in Holland. From 1821 to 1828, the mortality of the obstetric clinic in Amsterdam was 2.5 per cent. Soon after the School of Clinical Obstetrics was founded, and in the year 1829 the mortality had risen to 18 per cent. and from that time to 1848 averaged 18.49 per cent. This doubtless arose from frequent vaginal examinations without antiseptic precautions. Between the years 1848 and 1880 the mortality fell from 7.69 to 3.8 per cent. With the further development of antiseptics the mortality fell to 1.57 per cent. Attention is called to the

familiar story of the Vienna Clinic. There was, in 1840, a marked difference in the mortality in the clinic devoted to the instruction of midwives and that given to the education of students. In the latter the mortality was always much higher than in the former, at times reaching 31 per cent. and averaging from 10 to 20 per cent. In 1847, one of the staff of the hospital—Kolletscha—died from a wound infected by a puerperal patient. Autopsy revealed the lesions characteristic of pyemia in surgical cases. The similarity was so striking as to attract the attention of the staff, especially of Semmelweiss. He then instituted the disinfection of the hands with chloride of lime, when the mortality in the student's clinic fell to 1 per cent. In spite of all the efforts made to lessen puerperal mortality, it still remains considerable throughout the civilized world. Switzerland gives a mortality rate of 185 per 100,000; Prussia about 1900; Germany, 2800; England and Wales, 1550 per 100,000 from puerperal septic infection. The question arises how many of these patients might have been saved, and, while we recognize the existence of foci of infection before labor for which the obstetrician is in no way responsible, still the majority of these cases might have been prevented.

The mortality of puerperal septic infection is higher in cases delivered in private houses than in those attended in well-appointed hospitals. Thus, in the Hospital of the City of Basel, in 17,958 labors from 1901 to 1913, 5 patients (0.027 per cent.) perished from hematogenic infection. Two were infected by bacteria from foci of suppuration outside the genital organs (0.01 per cent.). From other infection, there were, at the highest estimate, 9 (0.05 per cent.), the whole averaging 0.5 per cent., or 1 in 2000 patients. This is certainly a good result and in favor of the hospitals.

When the comparative mortality of different portions of Switzerland is taken into consideration, it is found that in some cantons the mortality from puerperal septic infection is much greater than in others. This may be explained by the prevalence in these districts of disease of the skeleton, which contracts the pelvis, notably rachitis, and by the fact that much of the practice of obstetrics in these localities is done by midwives. The more frequently obstetric operations become necessary, the greater will be the mortality, unless these operations are done under favorable circumstances. Thus, the puerperal mortality from sepsis in some of the cantons reaches as high as between 3 and 4 per cent., and, of all mortality in childbirth, septic infection is present in 43.8 per cent. When Switzerland as a whole is considered, it is found that there has been a diminution in puerperal septic mortality from 3.97 to 2.37 per cent., and in recent years this has fallen to 2.02 per cent. The greater portion of puerperal mortality has arisen from septic infection, thus between the years 1901 and 1910, in 98,420 labors, there followed a general puerperal mortality of 3.85 per cent. and a

mortality from septic infection of 1.87 per cent. There is a considerable and gratifying lessening in the septic mortality.

Puerperal septic mortality is not the same during the various months of the entire year. At the end of winter and beginning of spring, the mortality is greatest. If the year be divided into halves, that which contains the colder and more inclement weather gives the higher mortality. Thus the month of March has the largest death-rate from puerperal sepsis. A study of the statistics of the city of Basel from 1900 to 1913 gives the general septic mortality as 0.52 per cent. and that, of 100 patients perishing from general puerperal diseases, 20.9 per cent. die from septic infection. This good result has been brought about from the fact that physicians are usually summoned to labor cases; that midwives are well educated and strictly watched in their work, and that a very large percentage of confinements take place in hospitals and not in private houses. The general puerperal mortality in the city of Basel is practically 2.26 per cent., and of 100 women dying in the puerperal period, 21.7 per cent. die from septic infection.

In 1896 the hospital was opened, and, in 1901, Ahlfeld's method of disinfection by hot water, soap and alcohol, and alcohol and acetone was introduced. From 1901 to 1913 but one puerperal patient became infected in the hospital.

The statistics of polyclinic practice give a general mortality of 1.19 per cent. The analysis of the statistics of the hospital at Basel show conclusively the advantages of confinement in a well-appointed hospital over those which the patients enjoy in a private house.

The writer next quotes the statistics of Germany. A general study of puerperal mortality shows that, while there has been an improvement in the general mortality-rate, the lessening of puerperal septic infection has not kept pace with it. From 1896 to 1900, a general mortality of 1.36 per cent. was quoted, which shortly after rose to 1.53 and then sank to 1.43 per cent. Comparison of the general and septic mortality shows that about one-half of the general mortality arises from puerperal infection.

In Prussia, the mortality from puerperal septic infection in 1912 reached nearly 1 per cent., and there was an increase in septic mortality between the years 1900 and 1905. The comparative mortality from all causes and septic infection varied in recent times from 41.5 to 44.6 per cent. Puerperal septic infection had an especially high mortality-rate in East Prussia, in 1909 reaching 44.16 per cent. Winter believes that the reason for this condition lies in the fact that, in some parts of the country, there are comparatively few physicians. The hygienic condition of the population is bad, and much of the obstetric practice is in the hands of midwives. Bayern shows a slight diminution in puerperal septic mortality, the percentage falling to 1.49 per cent., the septic mortality being relatively 40 per cent. of the whole. Sachsen

showed an increase in septic mortality of 1.76 per cent., a comparative mortality of the general being 48 per cent. Württemberg has a recent septic mortality of 1.46 per cent., which is 45 per cent. of the total puerperal mortality. Baden has a septic mortality of 1.6 per cent., 51 per cent. of the whole. Hessen has a septic mortality of 1.43 per cent. or 45 per cent. of the whole, a diminution in septic mortality. Mecklenburg-Schwerin, a septic mortality of 0.155, which is but 37 per cent. of the whole; Elsass-Lothringen, a septic mortality of 1.66 per cent., 47 per cent. of the whole. A review of the various provinces of Germany shows the lowest septic death-rate in Hessen, 1.33 per cent.; the highest in Sachsen, 1.76 per cent. The greatest diminution in septic mortality is in Hessen, 0.45 per cent.; the smallest diminution in Mecklenburg-Schwerin, 0.01 per cent., and throughout Germany a diminution of septic mortality, with the exception of Elsass-Lothringen, where there has been an increase of 0.27 per cent.

Sweden shows a late mortality from puerperal sepsis of 0.82 per cent., 35 per cent. of the entire puerperal mortality; the yearly septic mortality, 0.96 per cent., or 37 per cent. of the entire puerperal mortality. Madrid has a septic mortality of 3.42 per cent., 69 per cent. of the entire puerperal mortality. Paris, a septic mortality of 4.3 per cent., 71 per cent. of the entire puerperal mortality. Statistics show that from 1906 to 1910, the general puerperal mortality was 6.04 per cent., of which a large proportion was from puerperal sepsis. In fifteen years the septic mortality rose from 2.62 per cent. to 4.3 per cent., a result which is probably to be attributed to the increase in criminal abortion. Vienna gives a septic mortality of 3.28 per cent. which is 71 per cent. of the entire puerperal mortality.

When the mortality of cities is compared in recent years, Wien has a general puerperal mortality of 4.61 per cent.; Madrid, 4.92 per cent.; Paris, 6.04 per cent.; Berlin, 8.98 per cent. In Wien and Paris, puerperal septic infection has increased respectively 0.48 and 1.6 per cent.

In Austria, statistics show a mortality from infection of 1.83 per cent. This is a marked decrease, the lowest, however, having been reached in 1907 (1.64 per cent.) whence there is an increase to the last statistics.

In England and Wales only the births of living children are reported, and so the mortality statistics of these countries in comparison with others are too high. In order to form some idea, the percentage of stillbirths to 100 labors is quoted from the various countries. The highest percentage given is that of France, 4.6 per cent.; the lowest that of Sweden, 2.5 per cent. In England and Wales in ten years the mortality in childbirth was 4.9 per cent., of which puerperal sepsis had a mortality of 2.2 per cent. In the next succeeding six years, the septic mortality fell to 1.5 per cent. In ten years in England and Wales there has been a marked diminution in puerperal septic mortality.

The statistics of Norway give a septic mortality ranging from 1.37 per cent. to 1.41 per cent. In common with other countries, there was a steady decline until very recently, when the curve turns again upward. In comparing the septic mortality of countries, it is interesting to note that from 1901 to 1905 inclusive, there was an increase in septic mortality, while in other countries during the last four or five years, with the exception of Italy, Elsass-Lothringen, Paris, and Wien, there was a general diminution in septic mortality. A table of sixteen countries and four large cities is given, with the septic mortality-rate showing that Basel has the lowest (0.47 per cent.) and Berlin the highest, (5.44 per cent.) from septic infection. Those countries which show a marked diminution are also listed, with the successive lessening of mortality and those countries also showing an increase. It is a favorable sign that the last year of the first five years of the century showed an improvement in septic mortality, when compared with the first five years of the preceding century.

Von Herff adds a brief statement to the foregoing paper. He finds the explanation for the greater septic mortality of large cities in the prevalence of infection after abortion. In this, criminal abortion plays a large part. The fact that under the name of therapeutic abortion a criminal operation may be done by supposedly respectable physicians increases the mortality. This state of affairs is the more deplorable because this septic mortality might be prevented. It is evident that the antiseptic precautions commonly practised in maternities will never be widely employed in cities and in the country. The best maternity statistics must be taken as comparatively ideal. One cannot control ignorance and one cannot keep ignorant persons from going to those doctors and midwives who do not practise antisepsis, and who have septic mortality among their patients. In Basel, from this cause, there were 18 septic deaths after labor between the years 1901 and 1910. Of these, 17 had been transported to hospitals before death, and the opportunity was given to study the cases thoroughly by autopsy afterward. Of the 18, 14 could be directly traced to carelessness and incompetence, while in 4 one could not lay the blame on any particular source. In the best possible condition of affairs at present, once in 10,000 labors in city or country, there might arise a hemotogenic infection, and once in 20,000 infection from some focus of suppuration, often on the surface of the body of a puerperal patient. In general, it may be said that one-third of all deaths from puerperal septic infection are preventable and inexcusable. In one year, 185 women died from puerperal sepsis in Switzerland, and, of these, 148 were cases in which the infection should have been prevented. In Germany, the cases of preventable infection average each year 2600.

The method of disinfection practised in the clinic at Basel is essentially that of Ahlfeld, which consists of thorough cleansing with soap

and hot water, and, while the hands are wet, with hot sterile water and thorough preparation with alcohol. Recently acetone alcohol, or tetrachloräthylen soap dissolved in alcohol, has been used. The statistics show that from 1903 to 1913 inclusive, there were 16,999 confinements. Of these, 84.76 per cent. were entirely free from fever, 15.24 per cent. had fever, and the mortality from infection was 0.58 per cent. The percentage of married women among these patients varied from 85 to 88. About 92 per cent. came into the maternity more or less advanced in labor, often with ruptured membranes and frequently so near delivery that they could not be properly prepared. There were many primiparæ and multiparæ considerably above the average age among these patients. Among them there was a general morbidity from conditions in the generative organs of 9.45 per cent., and a general morbidity through complications in labor of 7.81 per cent. The examination of the statistics of the city of Basel and the maternity hospital shows that half of all the confinements in the city take place in the hospital. During this time in the city five women died of puerperal septic infection (a mortality of 0.49 per cent.). The corresponding statistics of the hospital state that for the same period 0.97 per 1000 was the septic mortality. This comparison is strikingly in favor of the maternity.

LABOR.

The Birth-rate in War Time. The *British Medical Journal*, December 25, 1915, publishes statistics which indicate that in war time the greater proportion of births are those of male children. In the Chesterfield District of England in the five years from 1909 to 1913 there was a preponderance of male births of over 4 per cent.; but from May, 1915, to November, 1915, the male births were in excess of the female births 10 per cent.

This has been observed by other statisticians at former periods in the world's history when there have been great wars. There seems to be no explanation for the circumstances unless it be the fact that human fertility is often increased by privation and distress in contrast to plenty and leisure.

Abnormalities in Labor Caused by Malformations of the Uterus. Van de Velde¹ calls attention to complications in labor arising from abnormality in the development of the uterus. He describes and illustrates various forms, and finds that complications in labor may arise from defective development of the uterus or from congenital abnormalities in the cervix. He reviews, to some extent, the literature of uterus duplex and uterus unicornis. In the former he cites a case to show that when one side of the uterus is pregnant, the other non-pregnant portion

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xlii, Heft 4.

may occasion complications in the expulsion of the fetus. He quotes Reynes and Stähler to illustrate the difficulties in diagnosis which malformation of the uterus may cause.

Muscular abnormalities are often present in these cases, and the cervix may be so abnormally rigid as to occasion delay and require the application of the forceps. Should rupture of the uterus be threatened, delivery by abdominal section may become necessary. Abnormalities in the delivery of the afterbirth are not as common in uterus duplex as in uterus bicornis or unicornis.

Congenital atresia may also complicate the progress of labor. The writer describes the case of a primipara, aged twenty-nine years, whom he saw in consultation during her labor. Uterine contractions were vigorous, regular, and occasioned considerable suffering. The physician in attendance could not find the opening of the womb nor could he make out the exact position of the child. The fetal heart sounds were good. The contraction ring was high in the abdomen and extended transversely and obliquely to the level of the umbilicus. The fundus was directed upward on the left side beneath the ribs. The region of the lower uterine segment was very sensitive to pressure.

Upon vaginal examination, the fetal head was in the pelvis and through the stretched wall of the uterus the sutures could be felt. No opening in the uterine wall could be detected. When the patient was anesthetized and a speculum introduced none could be found. High up on the right side the vaginal portion of the cervix was found and the os uteri which admitted one finger. The finger could be passed to the fundus of the right half of the uterus which could thus be proved empty. This portion could also be made out by bimanual examination.

Vaginal Cesarean section was done, without opening the abdominal cavity. After rupture of the membranes, a well-developed child was delivered by forceps in good condition. The placenta was removed and the uterus packed with iodoform gauze. The wounds were closed by suture, and the patient made a good recovery.

After this the patient had two pregnancies, one in the right half of the uterus which ended in abortion at about the fourth month, and the other in the left half of the uterus which did not go to full term. The child was born living, but died soon after birth from premature weakness. The patient afterward developed tuberculous peritonitis and had abdominal section followed by recovery. At the section, both Fallopian tubes were found tuberculous and were removed. The uterus could then be accurately observed and it was found that the urinary bladder was in the middle between the two halves of the uterus. There were two cervices.

The writer quotes the cases and opinions of Ginsberg and Fränkel.

In the management of these cases it is desired, if possible, to deliver them through the vagina. If, however, this shares in the imperfect

development of the upper portion of the genital tract, it may be necessary to resort to abdominal section. When no opening can be found to the uterus through which a child can pass, abdominal section must be performed, accompanied by extirpation of the womb.

So far as observation has gone, it seems that both halves of the double uterus share in menstruation.

Labor Complicated by Injury to the Symphysis Pubis. Kehrer¹ reviewed the literature of this subject and published a condensed account of 100 cases, and adds a case under his own observation.

As one may expect, rupture of the symphysis often follows use of the forceps applied to the fetal head still in the pelvic brim. It is estimated that 69 per cent. of rupture of the symphysis follows the use of the forceps. The extraction of the head after craniotomy, when the pelvis is greatly contracted, may produce the same result.

In Kehrer's collection of cases, rupture of the symphysis followed forceps operation in 55.4 per cent. This accident may, however, occur when the head has descended into the cavity of the pelvis or is even at the outlet of the pelvis and is delivered by forceps. Poulet endeavored to ascertain the force required to rupture the symphysis and experimented upon the cadaver. He found that from 170 to 200 kg. was necessary, but he estimated the average force applied in the use of the forceps as that equal to raising a weight of from 20 to 25 kg. The same results have practically been reached by other observers.

Extraction of the child from the pelvis in breech presentation, and especially in primiparæ, in cases where the head of the child is large, may readily produce the accident. Exceptional development of the fetal shoulders may bring about this result. Zweifel reports the case of a woman who had a rupture of the symphysis following the delivery of the child by forceps and who could not walk for seven weeks. Nine years later the head of an unusually large child was drawn from this pelvis by Tarnier's forceps. The shoulders of the child were unusually large, sticking in the pelvis, and the traction necessary to deliver the child produced for the second time a ruptured symphysis. Before the days of forceps, the obstetric lever used in forcible delivery of the child produced rupture of the symphysis.

This accident may also happen in spontaneous labor. Statistics give a frequency of 26, 23, and 17 per cent.

It is also true that in the puerperal period a sudden, vigorous movement on the part of the patient, although lying in bed, may produce rupture of the symphysis. In explaining this, it may be urged that the joint must have been injured during the confinement.

Partial rupture of the symphysis is by no means unusual and may follow direct violence, as in cases reported where a pregnant patient was

¹ Monatsschr. f. Geburtsh. u. Gynäk. 1915, Band xlii, Heft 4.

thrown against a tree, or thrown violently from a wagon or fell down a flight of stairs. In 1 case a pregnant woman, working in a factory, received a violent blow against the pubes.

In accounting for the rupture of the joint in spontaneous labor, it must be remembered that it happens usually in contracted pelvises. The explanation is to be found in the fact that in most patients the pelvis during labor is not a fixed body, but that its various joints permit some motion, resulting in some expansion of the pelvis as the child passes through. This is practically maternal adaptation of the pelvis to the passage of the child.

Most cases arise in contracted pelvis of moderate size. In highly contracted pelvis it is impossible for the child to enter the brim, and so no rupture of the symphysis can occur. Some have thought that the accident is most frequent in osteomalacia, generally contracted and triangularly contracted pelvises. It is, however, impossible to assert that any one form of pelvis positively predisposes to rupture.

Cases have been observed in flat pelvis, and in flat, rachitic pelvises.

In making a diagnosis, one may recognize three different grades of this accident. The first is that in which examination shows extreme stretching, with some elasticity of the ligamentum arcuatum and also the broad pubic ligament. No definite space can be felt, in these cases, between the two halves of the pubes. This condition may develop during pregnancy, and be present during repeated pregnancies.

The second variety is that of partial rupture of the ligaments of the joint, usually occurring during labor and rarely developing during pregnancy.

In the third variety, the ligaments are completely ruptured. This can occur in labor through excessive violence, and the injury is rarely limited to the pubic joint but there is ulceration of the vagina, bladder, and urethra. Not recognizing the accident, the patient may be conscious of pain and distress during the labor, and further symptoms develop during the first few days after confinement. There is a sensation described by some patients of something tearing in this region. The obstetrician may detect crepitus on manipulating the joint. This is not invariably present and its absence should not lead to error in diagnosis. If there be no significant symptom at the time of labor, so soon as the patient endeavors to move during the puerperal period, the condition will become apparent. Upon vaginal examination, the two halves of the joint can be felt to move and the finger can be inserted into the space between the broken ends.

Where rupture occurs during labor, the presenting part may suddenly recede and the posture of the mother's extremities may also be significant. The limbs are partly flexed at the knees and rotated outward, so that the knee, the leg, and the foot rest practically upon their outer surface.

In addition to rupture of the joint itself, complications must invariably arise from laceration of the surrounding soft tissue. This may prove a serious or fatal element in the case. The urethra has been torn across, the bladder torn, and the vessels lacerated, causing profuse hemorrhage. A complication almost invariably present in these cases is the formation of hematomata in the cellular tissue about the vagina, urethra, and anterior vaginal wall. This collection of blood may reach considerable size, and, should it become infected, add greatly to the gravity of the situation.

Suppuration of the symphysis pubis has been observed, and varies in frequency from 38 per cent. The mortality in this accident may be considerable. Stumpf states that, of 35 patients, 74 per cent. perished from septic infection. Embolism not infrequently happens in these cases and is a serious complication. An extraordinary case is reported in which a patient suffered from gangrene of the foot following embolism of the posterior tibial artery.

The *prognosis* of rupture of the symphysis depends very largely upon the presence or absence of embolism and septic infection.

The permanent condition of these patients depends upon the development of septic infection. Where such is absent, should the patient receive proper treatment, ligamentous union will gradually occur. Should suppuration develop in the joint, if the patient recovers, bony union may develop.

Medicolegal questions may arise as to the responsibility of the operator for this accident in cases of forceps delivery. It would be necessary for the physician to show that skill had been exercised and that excessive force had not been used.

In the *treatment* of this condition, most obstetricians employ a supporting bandage encircling the pelvis. It is impossible to completely immobilize the joint. If moderate pressure be made upon the pelvis, this will be sufficient if the patient lies upon her back. Suture of the ends of the bone has not been especially successful. In cases in which there is injury to the urethra or bladder, operative procedures must be undertaken as each case indicates.

This interesting question arises, "Is a patient who has once had this accident more apt to have it in a subsequent confinement?" Obstetricians report abortions and premature birth following in subsequent pregnancies, and, when the pregnancy goes to term, the obstetrician should wait for the development of labor in the hope that spontaneous delivery will occur.

Kehrer's case is as follows: The patient, aged twenty-six years, was in her third pregnancy. She had a contracted pelvis and the first child was dead born, delivered by version and extraction. The second child was stillborn delivered by forceps, and during the third labor an effort was made to deliver by the application of forceps to the

head of the child standing high in the pelvic brim. Upon admission to the hospital, the head of the child was found to be somewhat harder than normal. With the hope of bringing about spontaneous expulsion, pituitrin was given and the patient put in Walcher's position, and pressure exerted behind the pubes. As spontaneous birth did not occur, subcutaneous symphysiotomy was done. Before the operation the patient was carefully catheterized, and, in introducing the hand to force up the fetal head for the introduction of the catheter, an abscess ruptured, and foul pus and amniotic liquid escaped. This indicated that the amniotic liquid had become infected. In order to terminate labor, a very cautious application of the forceps was made, which proved unsuccessful, and was followed by craniotomy. After the first three applications, the head did not essentially advance and traction was again made, when a definite crepitus or crackling could be heard, indicating that the symphysis had ruptured. The hand placed above the pubes found a space between the two halves of the joint in which two fingers could be laid. It was then possible to deliver the head of a male child weighing 4340 grams and 55 cm. in length. The measurement of the head showed unusual development.

Examination showed that the urethra had been completely detached from the under surface of the pubes. There was also hemorrhage on the left side in the region of the clitoris, which was readily controlled by the application of a hemostat. The urethra had been completely ruptured and forced upward to the right. The injuries seemed much greater upon the left than upon the right side, and the finger introduced through the laceration came distinctly upon the two severed ends of the joint. After tying a few small vessels, the tissues were tamponed with iodoform gauze. It was impossible to find the urethra in spite of prolonged search, so it was impossible to insert a permanent catheter.

Upon examining the child, wounds of the scalp were found and upon one parietal eminence there was a discolored bruised portion indicating where the head had pressed against the severed end of the pubes. There were also signs of pressure, and the child was stillborn. On section, there were injuries to the tentorium, and blood in the lateral ventricles. There was also on each side extravasation of blood beneath the dura. The patient did badly, with continued discharge of foul material, and, on the sixteenth day, after making an effort to raise in bed, died suddenly from embolus. On section, the ends of the symphysis were 2 cm. asunder, the urethra was torn and necrotic and the wounds made at delivery were foul and necrotic.

An interesting case somewhat analogous of rupture of the symphysis in a little girl is reported by Fischer.¹ The child was aged between one and two years, and was run over by a loaded wagon. When picked

¹ *Deutsch. Ztschr. f. Chir.*, 1891, Bd. 31, S. 435, No. 13.

up, the child was lying upon its abdomen, and upon examination, the symphysis was found ruptured and the tissues torn, and the finger introduced passed into the cavity of the pelvis. The child made a tedious recovery, and as the urethra was injured, there was a constant leakage of urine. She made her first effort to walk five weeks after the accident, and was discharged from the hospital in seven weeks with incontinence of urine. Three months after the accident, the child had made a fairly good recovery.

Among others there are 13 cases of rupture of the symphysis reported in surgical literature occurring in men through accidents.

A Case of Labor Complicated by Shoulder Presentation. Astley¹ reports the case of a multipara who suffered much during gestation from varicose veins. Supposing that she had gone over the usual period, the induction of labor was attempted by the use of a large rectal bougie. The membranes were punctured by the bougie and much amniotic liquid escaped. After fifteen hours the bougie was removed. Pains developed and the child was found to be transverse. Morphin was given to prevent injury to the uterus, and preparations made to perform version. Upon administering the anesthetic, it was found that spontaneous correction had taken place. The hand appeared with the head and the patient was spontaneously delivered.

Complications afterward developed, and it was found that a tear in the bladder had occurred admitting two fingers, situated at the left side of the vaginal neck. With the use of a permanent catheter, the patient recovered.

The Functions of the Bladder after Confinement. Taussig² reports an analysis of 157 puerperal cases investigated regarding the functions of the bladder after confinement.

Among these, 6 required catheterization one or more times. This is a smaller percentage than that reported by Continental observers.

The average time elapsing between delivery and spontaneous micturition in the 157 patients was a little over seven hours. When a comparison is made of the duration of labor and the time required for the recovery of the functions of the bladder, it is found that the shorter the labor, the more quickly the patient resumes the normal functions of the bladder.

Fifty-eight out of 151 patients had lacerations sufficient to require some sutures, and there was no delay in the emptying of the bladder among these patients, nor was there an increased proportion of catheterizations. There was very slight difference between multiparæ and primiparæ, the primiparæ regaining the normal functions of the bladder a little more slowly than the multiparæ. After artificial delivery by operation, the average time for normal micturition was nine hours.

¹ American Journal of Obstetrics, August, 1915.

² Surgery, Gynecology and Obstetrics, October, 1915.

In cases requiring catheterization after labor, cystoscopic examination has found edema surrounding the sphincter of the urethra. This was thought to be responsible for the delay in emptying the bladder. The puerperal bladder has a greater capacity than normal, which is also a factor. This is especially true in multiparous patients. Severe obstetric operations naturally cause atony of the bladder; also a vaginal gauze pack may interfere with micturition.

When it is necessary to give an anesthetic, the influence of the anesthetic is invariably to delay spontaneous micturition. When there is a tendency to atony of the bladder, a good result is sometimes produced by injecting several ounces of air into the full bladder. Examination with the cystoscope shows this produces contraction and stimulates the action of the bladder.

The Use of Pituitrin in Labor. While no recent developments of importance concerning this substance are recorded, experience in its use naturally accumulates.

Zälig¹ reports the case of a woman, aged forty-five years, who had borne 13 children, who had very slight contraction of the anteroposterior diameter of the pelvis. The symphysis was abnormal in position, labor had always been induced, and there had been, on several occasions; craniotomy. On the occasion reported, the head was firmly wedged in the brim of the pelvis. Two injections of 0.5 c.c. of pituitrin were given. A quarter of an hour after the second injection, the contraction ring developed in the uterus, and, while the patient was being brought to the hospital, the uterus ruptured. The fetus was 48 cm. in length.

Hrdlicka² reports that, in Rubeska's Clinic, pituitrin has been given six hundred and six times in 390 cases. The methods of administration were subcutaneously, intravenously into the cervix and into the uterine muscle. When the drug was administered before definite uterine contractions, complications were observed during the first stage of labor in 7.9 per cent.; during the second stage in 4.5 per cent.; during the third stage in 27.3 per cent., and after this 33 per cent. In the third stage of labor and after this substance should not be used, and a much better result is obtained by the use of some preparation of ergot. During the second stage of labor, it was given by intravenous injections in 140 cases, and at the end of the second stage when the head remained in the outlet of the birth canal, when the fetal heart sounds were altered and it was necessary to secure very prompt birth of the child. In these cases the result was good, and the fetus suffered no injury. As a rule, however, if the fetal heart sounds are much altered, the drug should not be employed.

In 13 cases of placenta previa, pituitrin was used once. In 7 cases of Cesarean section, pituitrin was injected directly into the muscular

¹ München. med. Wehnschr., 1915, 22.

² V Kongress Tschechischer Naturforscher und Aerzte in Prag, 1914.

tissue of the uterus at operation. In 5 cases the uterus contracted promptly; in 2 gauze packing was necessary. In 14 cases of fever complicating labor, pituitrin was administered in 5 without apparent injury. In 8 cases having nephritis, 4 with eclampsia and 3 with heart lesions, there was no bad result so far as could be observed, from giving pituitrin. The writer, however, does not recommend it in these cases, and especially where there is myocarditis. In 10 cases of abortion, pituitrin acted well, especially in the early months. The administration of pituitrin was never observed to cause abortion. In 1 case it seemed to produce occlusion of the internal os. In 7 cases of induced labor after the rupture of the membranes, or after the introduction of the dilating bag, pituitrin was given with but one bad result.

Gruss¹ reports that in Pitah's Clinic in Prag, pituitrin and pituglandol have been given in several hundred cases. The method of administration was by intramuscular injection of 1 c.c. repeated until a result was obtained. In some cases as much as 6 c.c. was given. No bad results were observed.

It should not be given to bring on labor at the end of pregnancy, but after the introduction of a dilating bag it is useful, especially when pains have already developed. The best results from this substance are obtained in secondary uterine inertia, and the more near expulsion the presenting part is, the better the result. There must be complete dilatation, and the amniotic liquid should have escaped. Since the use of pituitrin, the percentage of forceps applications at the outlet of the birth canal has fallen from 3.5 to 2.

In labor with twins, flat pelvis, disproportion between the head and the pelvis, placenta previa, and obstetric operations, pituitrin is useful. During the placental stage of labor, it gives good results, and hemorrhage occurs only in those cases which were not influenced by pituitrin during the second stage, or when some portion of the fetal appendages has been retained.

It cannot be asserted that pituitrin is of value in treating retention of urine complicating the puerperal period. In one labor it was thought that the use of pituitrin had resulted in the death of the child. In other cases alterations in the fetal heart sounds were observed after its use. Frequently this was an indication for the prompt performance of an obstetrical operation. While pituitrin is a useful drug to stimulate uterine contraction, it is by no means a panacea.

Levi Rassegna² has reviewed the Italian literature of obstetrics covering the use of pituglandol and pituitrin. He has used the remedy in 12 carefully observed cases, using the extract furnished in small ampoules. In his series of cases, there were 10 primiparæ, and all of the patients had normal pelvises. The pituitrin was given three times

¹ V Kongress Tschechischer Naturforcher und Aerzte in Prag, 1914.

² Annali d'Ostetricia e Ginecologia, 1915, Nos. 3 and 4.

during the first stage of labor and usually during the second. Of the 12 cases, but 4 ended spontaneously; in 6 the forceps were used; in 1 craniotomy on a dead child; and in 1 extraction with the blunt hook was practised. In 4 patients there was some postpartum hemorrhage, requiring intra-uterine applications of the tampon in 2. Six of the children were born asphyxiated but revived, but 1 became again asphyxiated and died an hour after birth; 2 were stillborn, and but 3 of the 12 cried naturally after birth. The writer comes to the conclusion that the drug is dangerous for the fetus unless in exceptional cases, as in his cases no other cause for the asphyxiation could be found. The influence of pituitrin upon the third stage of labor in its duration and the amount of blood lost is not favorable. The writer cautions against the indiscriminate employment of pituitrin.

The reviewer recently received a letter from a general practitioner of medicine who practises obstetrics stating that he had used pituitrin very considerably in his practice and it had greatly shortened labor and had lessened the tedium of his work; however, his patients were annoyed by the fact that in many cases the infant was stillborn or born asphyxiated, dying soon afterward, and the thought occurred to the physician that possibly pituitrin was responsible for it! He was informed that pituitrin had caused more infants' deaths than any other substance employed in obstetric practice at the present time.

Pituitrin is useful in cases in which it is desirable to secure a prompt, vigorous, and rapid contraction of the uterine muscle after the uterus has been emptied completely, so in Cesarean section it is useful. Its only use in labor which is justifiable is when the presenting part is practically visible in the birth canal and but one or two good pains are needed to secure the prompt expulsion of the child. If the heart sounds are good and the mother's condition is good, one injection of pituitrin will usually terminate labor without injury to mother or child. To secure lasting uterine contraction, pituitrin is far inferior to strychnin and ergot used together.

Scopolamin-morphin Amnesia in Labor. Polak¹ gives his experiences in the treatment of cases of labor in the Long Island College Hospital with the use of scopolamin-morphin. He has found that in from 85 to 90 per cent. of cases, it was possible to produce a condition of amnesia. It must be remembered that the use of this method has the same relation to the first stage of labor as the administration of chloroform or ether has to the period of expulsion. One of the advantages thus obtained is the freedom from exhaustion caused by suffering. The number and severity of the lacerations seems to be reduced, and there is less necessity for the use of the forceps for primiparæ. The method seems especially successful during the first stage of labor; during the second, too large a dose may readily be given, and labor be unduly prolonged.

¹ American Journal of Obstetrics, May, 1915.

When patients do not yield readily to this treatment, it should not be pushed. Cyanosis on the part of the child indicates too large a dose, or a moderate dose given too frequently or too late in labor, or that the second stage has been allowed to continue too long.

In highly nervous women who bear suffering poorly, this method may be useful during a prolonged first stage. Thorough dilatation is thus secured with the least possible pain, and the patient is brought to the second stage in the best possible condition. When the amniotic liquid has escaped, or the presenting part is pressing directly against the cervix, this method may give considerable relief. It is also thought to be efficient in borderline contraction cases, and will assist the patient in bringing the presenting part into the pelvis. In patients who have cardiac disease the method seems to prevent shock and suffering, and thus favors spontaneous labor. So in patients having tuberculosis, the method avoids the irritation of anesthesia and relieves the patient's sufferings.

In obstetric emergencies, as placenta previa, accidental hemorrhage, eclampsia, prolapse of the cord, primary inertia, precipitate labor or fetal death, its use is contraindicated.

Two methods have been introduced for carrying out the treatment, one that of Siegel who uses the drugs in a routine manner according to a definite schedule; the other that of Gauss who varies the dose with regard to the peculiarities of each patient. In this plan, but one dose of hydrochloride of morphin is given.

As imported, the drugs come in ampoules each containing scopolamin hydrobromide $\frac{1}{200}$ grain, and solution of narcophin 0.03 gram. When labor has fairly begun, $1\frac{1}{2}$ ampoules of each drug is given hypodermically as the initial dose. Forty-five minutes later 1 ampoule of scopolamin is given alone. One hour after this $\frac{1}{2}$ ampoule of each. The amnesia is maintained by repeating the scopolamin alone every two hours in doses of $\frac{1}{2}$ ampoule. It is rarely necessary to repeat the morphin, although it may be given every third time at six-hour intervals in a long labor. It is the morphin which sometimes affects the child.

In the Gauss method, one dose of morphin hydrochloride, grain $\frac{1}{8}$ to $\frac{1}{6}$, and scopolamin hydrobromide, 0.0003, is used. The morphin is not repeated, but the scopolamin in doses of 0.0003 or 0.00015 gram is given at varying intervals.

His experience embraces 155 cases, with three failures. One hundred and fifty had no recollection of labor after the second injection; a few had occasional intervals of memory; 10 per cent. had some delirium during the stage of expulsion. There was no fetal mortality. There were nine low forceps operations in this series, although the majority of patients were primiparæ. There has been no case of postpartum hemorrhage.

Beach¹ collects his statistics of 1000 cases of labor, and compares them with similar statistics without this method of treatment. The statistics on the whole show that, when intelligently used and strictly supervised, the method is of value with nervous women and those who bear pain badly; when the first stage is especially long and painful; or in cases complicated by cardiac disease, pulmonary tuberculosis, or other abnormal conditions of the lungs. To get the best results, the treatment must be carried out under ideal surroundings with the smallest possible dose, and by someone who has trained himself to do this special sort of work.

The Induction of Labor by Drugs to Stimulate Uterine Contractions. Voirol² describes his experience in using a substance derived from ergot and combined with substance isolated from the pituitary gland. These are complex chemicals, as follows:

Oryphenylethylamin or tyramin.

Imidazolethylamin or histamin.

Phenylethylamin.

Isoamylamin.

This preparation was first put upon the European market under the name of tenosin, and later called ergin. Rübsamen has tried them, and, after studying his results, it was thought best to vary the proportion of the different ingredients. The remedy was given in doses of 1 c.c. at each injection, and, if necessary, repeated in from ten to thirty minutes. Very rarely a single dose may be 2 c.c. Sixty-two patients were treated, varying in age from sixteen to forty-three years. The indications for the use of the remedy were uterine inertia, retention of the placenta with hemorrhage, postpartum uterine relaxation and subinvolution. Of this series, in the cases of uterine inertia, 4 gave a positive reaction, 2 negative, and 4 gave no tangible result. In retention of the placenta, 3 gave positive result and 6 negative. In relaxation of the uterus after labor, 35 yielded a good result, and 11 were negative. In subinvolution of the uterus, the proportions are not stated. In general, it may be said that 68 per cent. showed a prompt and vigorous uterine contraction following the injection of the remedy. In 8 of these, there was absolutely no result, or in 12 per cent. In 1 case, or 1.6 per cent., the remedy was somewhat different from that ordinarily employed, and the result was less prompt.

As regards the puerperal period, the remedy was tried in 61 cases. There seemed to be a good effect in cases of subinvolution of the uterus, or where a bloody discharge persisted after labor, or where the general tone of the uterine muscles seemed deficient. In cases of abortion, the remedy was useful. Of 105 cases there were 15 patients who showed

¹ American Journal of Obstetrics, May, 1915.

² Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

some inconvenience or bad result after taking the remedy. The dose had been 1 c.c. These cases included prostration, cyanosis, ringing in the ears, headache, feeling of dizziness, heat in the head, irritation of the stomach and palpitation of the heart. In 4 the pulse was small, frequent, and irregular, and in 1 patient collapse developed. In no case was there very strong tetanic contraction of the uterus. The conclusions reached by the writer are distinctly favorable, especially since one of the substances combined in the remedy, and which seemed to produce bad effects, has been removed.

Analgesia and Anesthesia in Labor. Davis¹ published a paper upon this subject, in which he calls attention to the fact that those women who suffer severely during confinement become considerably depressed by the sensation of pain. Opium has long been the standard remedy in a long and very painful first stage of labor, and nothing has taken its place. It may be combined with atropin to advantage, and in some cases codein is to be preferred to morphin. During the stage of expulsion, brief anesthesia at the height of the pain, conducted with skill, is the best method for mother and child. If this be skilfully done, a brief period of absolute unconsciousness is secured, followed by the very prompt awakening of the patient. Much of the benefit derived from specific methods lies in the absolute isolation of the patient which is considered so essential. There is undoubtedly a very positive effect produced by an encouraged mental attitude to a depressed and despairing condition of the mind. The scopolamin-morphin method, to be successful, requires pure drugs, absolute isolation of the patient, careful selection of cases, and the services of those trained in the use of the method. This combination is not always easy to obtain. When the effort has been made to conduct experimental delivery under scopolamin-morphin, the results have not been good.

Pantopon, a preparation of opium, has been combined with scopolamin-hydrobromide and the success of this method for transient anesthesia was gratifying. For prolonged anesthesia, ether or chloroform was necessary.

The application of cocain, followed by epidural injection of novocain and suprarenal solution, or also by the alypin and suprarenal solution, has been tried by Reinlander. The cocain was applied to the nasal mucous membrane and did not influence labor pains. The epidural injections were made in the sacral region when labor became active, and the method was successful in rendering labor painless in only a small percentage of the patients treated.

Spinal anesthesia may be useful in unusual cases where inhalation cannot be employed. Novocain is the drug most frequently given.

During the first stage of labor, a complete emptying of the bowel by

¹ American Journal of the Medical Sciences, January, 1915.

copious hot high enemas, the emptying of the urinary bladder, the use of bromides by mouth in nervous patients, absolute quiet, and whatever can be done to make the patient as comfortable as possible may be of great service.

During the second stage of labor, when the patient becomes oppressed by suffering, and fatigue is threatened, strychnin, digitalis and codein, given hypodermically together, have been proven useful. When expulsion is imminent, just at the moment of expulsion, a skilful use of ether in very small quantity will cause the patient to know nothing whatever of the actual birth of the child, although she rouses to consciousness almost immediately after its expulsion.

The effort to render labor painless, unless combined with ample judgment and experience, may bring about disaster.

NITROUS OXIDE ANESTHESIA IN LABOR. Davis¹ reviewed the development of nitrous oxide anesthesia in obstetrics, and states that, as far as he knows, its first prolonged use in America was in July, 1913, when a patient received this anesthesia during labor for more than six hours. The results were satisfactory.

It is possible to begin analgesia whenever the uterine contractions become painful. If started early in labor, a high percentage of oxygen should be used, and two or three inhalations given. Later, less oxygen is used, or the patient is allowed to make five or six deep inhalations previous to the bearing-down effort. The gas must be inhaled with the first suggestion of a pain. The patient is then urged to help herself, and is given another inhalation containing a larger percentage of oxygen. In using the apparatus, the gas-bag should be only about one-half full. The mixture of nitrous oxide and oxygen varies, and must be determined for the patient.

A small and convenient apparatus has been constructed which can readily be carried to private houses. The cost of this anesthesia may be reckoned at between \$1.50 and \$2.00 per hour. In hospital practice large cylinders may be used, and the cost to the hospital made somewhat less. In no case has it been necessary to maintain the analgesia for more than six hours. In multiparæ, it is rarely necessary to exceed two hours. In primiparæ the labor is usually ended in less than three hours from the beginning of the painful contractions. Should it be necessary to deliver by an operation, the analgesia is increased to anesthesia. In analgesia it is necessary to stimulate the confidence of the patient and mental suggestion is of great value.

The advantages of this method lie in the fact that it is safe, whether in the home or hospital, that it is free from the dangers of chloroform and ether, and far superior to scopolamin-morphin, and that it has no bad results upon mother or child.

¹ Journal of the American Medical Association, September 18, 1915.

Labor followed by Unusual Hematoma. Wahrer¹ was called to a multipara who had given birth to her second child seventeen days previously. The labor had been slow, but a living child weighing 9 pounds had been spontaneously born. As the placenta was not expelled in several hours, the attending physician introduced his hand into the uterus and removed the placenta which had been adherent. There was no unusual bleeding. Two days later the patient was pale, with excessive vaginal discharge and complaining of nausea. The temperature was 99° F., pulse 90. Sometime later the patient had chills and moderate fever, and the uterus was irrigated. The pulse and temperature rose slowly, and, on the fourteenth day after confinement, a large mass was noticed in the abdomen. This had gradually increased in size.

Seventeen days after confinement the patient was excessively pale. The pulse was 170, and the temperature 104° F. A study of the abdominal condition showed that the mass occupied the entire right side, rising from the pelvis and disappearing under the ribs. The abdomen was the size of a seven months' pregnancy. The mass was smooth, rounded, and firm. There was no tympany, vomiting, or evidence of peritonitis. The bowels had moved by catharsis and enemata.

Upon examination, the uterus was movable, but could not be distinctly outlined, and the cervix was slightly enlarged. There was no thickening or resistance of the right fornix; no bulging into the vagina. There was a slight bloody vaginal discharge. The patient had evidently lost a considerable quantity of blood.

Upon opening the abdomen, a dark red tumor, retroperitoneal, of considerable size, was found. It was in direct contact with the liver above and seemed blended with the uterus below. The appendix was normal. The patient's condition was alarming; the anesthesia was stopped and a large hemostat thrust into the tumor, the blades widely separated. The introduction of the instrument was followed by a rush of black, bloody fluid containing some clots. A handful of this was removed, and the cavity tamponed with gauze. The patient rallied under stimulation, and ultimately made a good recovery. There was no suppuration about the wound. In three weeks' time the mass was about the size of an orange, and disappeared entirely in five weeks. The patient's general health was subsequently good.

The interesting feature of the case was the large size of the tumor, its very gradual formation, and the obscurity concerning the method of formation. A correct diagnosis without opening the abdomen could not have been made.

Labor Complicated by a High Position of the Head without Obliquity. Martius,² in 1586 cases of parturition, had in 5 seen labor delayed by the

¹ Surgery, Gynecology and Obstetrics, April, 1915.

² Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvi, Heft 3.

anteroposterior position of the head without obliquity of the occiput anteriorly, and the same condition in 1 case with the occiput posteriorly. These cases were treated in various ways, usually by correcting the position of the head, employing Walcher's position. In some, delivery was effected by the use of forceps.

The writer believes that the back of the child may occupy any relative position in the uterus, so the head may present at the pelvic brim in any position which the peculiar contour of the head and pelvis bring about. When the pelvis is a long oval and the head of similar shape, this abnormality in labor may occur. When the pelvis is perfectly round, or the head perfectly round, or when the head of the child is small in proportion to the pelvis, the condition under consideration may develop. The same condition may develop in some cases of flat pelvis, or where the contour of the head and pelvis is such that it is practically impossible for the head to stand transversely in the pelvic brim.

In the majority of cases, when the size of the head and pelvis is normal, spontaneous labor finally develops. In this, as in other abnormalities in the mechanism of labor, the use of Walcher's position is especially valuable.

Labor Complicated by Injuries to the Pelvis. Weibel¹ reports the case of a patient, aged twenty-nine years, who had had three spontaneous labors. About two years before the patient fell on the right trochanter, injuring the pelvis. She was then three months pregnant, but the pregnancy was not interrupted and labor was spontaneous but somewhat longer than the average. The child was not well developed but lived. The patient again became pregnant soon after and came to the clinic in her third month asking that the pregnancy be terminated because she had had a tedious labor before.

Upon examination, the pelvis showed a very marked contraction in its bitrochanteric diameters; the external anteroposterior diameter and also the internal were considerably reduced. The oblique diameters showed a difference of 1 cm. between the right and the left. The right leg was shortened 3 cm. and there was ankylosis of the right hip. Later the patient came into labor, and when the membranes ruptured, the head of the child stood transversely. The occiput showed a tendency to turn behind, causing the small fontanelle to sink deeply into the pelvis. Uterine contractions were vigorous and the head descended transversely and anterior rotation occurred. The head during labor was strongly flexed but was not molded to the pelvis and showed no depression in the cranial bones. The child was 52 cm. long and weighed 3750 gm. Mother and child made a good recovery.

In some cases of injury to the pelvis where the patient falls for some distance, the trochanter may receive the shock of the fall and the

¹ Zentralbl. f. Gynäk., 1915, xxi.

neck of the femur be driven into the pelvic wall. An irregular fracture may take place in the acetabular cavity, and as a result, one of the oblique diameters of the pelvis may be considerably lessened. This condition can best be ascertained by palpating the walls of the pelvis, if necessary under anesthesia. The attention of the obstetrician will be drawn to the condition by the history of the accident and the obvious deformity of the patient.

The Reappearance of Menstruation after Labor. Ehrenfest¹ tabulated the histories of patients to ascertain the facts concerning the reappearance of menstruation after labor. He found that in over 50 per cent. of the patients nursing children, menstruation reappears within twelve weeks after delivery. In over 80 per cent. of these, the first menstruation appears before the cessation of nursing. In primiparous women the percentage of those who begin to menstruate before the child is weaned is still larger.

As regards the relative condition of the patients, the healthy, strong woman is likely to menstruate early, while generally weak or temporarily weakened women, as a rule, remain longer without the return of menstruation. Lactation is evidently one of the weakening influences, because in a woman nursing a large child, the reappearance of menstruation is markedly delayed. The examination of a number of patients seems to indicate that a retrodeviation of the uterus is a factor of importance in the early return of menstruation.

In general, it may be stated that a debilitating influence, exhaustion beginning at labor and later by the loss of body fluids during nursing with rare exceptions retards ovulation. As soon as the disturbed balance is restored, the ovary resumes the function of ovulation and the first corpus luteum sends its hormone to the endometrium. The response of the latter is to some extent dependent on the anatomical condition of the uterus. If this be normal, typical menstruation ensues, but if, for any pathological condition the uterus is hyperemic, menstruation may be unusually abundant. If the uterus is in an atrophic condition, it may require stimulation of more than one ovulation to restore it anatomically to the degree of resuming its function. If menstruation once becomes reestablished during lactation, it continues practically with regularity. The so-called debilitating influence of lactation is dependent largely upon the general condition of the woman.

Labor Complicated by Congenital Dislocation of the Hip. Pery and Balard² describe the case of a patient, aged twenty-four years, who had double congenital luxation of the hip-joints. The patient was near term in her first pregnancy. Upon examination of the pelvis, the promontory

¹ American Journal of Obstetrics, October, 1915.

² Archives mensuelles d'Obstétrique et de Gynécologie, February, 1915.

was not accessible. The contour of the superior strait was an irregular circle, and further study of the pelvis showed atrophy of half of the pelvis as the result of diminished action. The pelvis was not materially contracted. Labor was spontaneous.

He also reports a second case in which it was thought best to induce labor by introducing bougies. This was followed by the introduction of a dilating bag and the rupture of the membranes. The head descended but did not proceed. Two injections of pituitrin were given which produced no essential advance. The patient was finally delivered by forceps without much difficulty, and mother and child made a good recovery. The study of these similar cases shows that it is not the mere presence of congenital dislocation, but atrophy of the various portions of the pelvis which alters the contour of the pelvis and may give rise to complications during labor.

The Conduct of Labor in the Hospitals of Paris. Bonnaire¹ reviews the essential changes which have taken place in the conduct of parturition and in obstetric practice in general in the hospitals of Paris. The improvement which modern obstetrics has introduced is seen in the lessened puerperal morbidity and mortality. The puerperal period is considered in ordinary cases to last for three weeks after the birth of the child, and during this time the attending obstetrician supervises naturally the progress of the case. The purpose of modern obstetric practice is said to be the complete recovery of the mother and child; in fact, a normal puerperal period.

The Treatment of Postpartum Hemorrhage. Zweifel² believes that one of the most important considerations in obstetrics consists in the *prevention of postpartum hemorrhage*. When uterine contractions are deficient, he warns against immediately resorting to the emptying of the uterus, drawing attention to the fact that, so long as the fetus is in the uterus and the placenta normally attached, no severe hemorrhage can take place. If, however, the placenta is speedily separated, or labor occurs quickly, a serious and even fatal hemorrhage may ensue. Deficient labor pains do not indicate immediate emptying of the uterus, but that measures be taken to increase the vigor of uterine contractions. When the uterine muscle begins to act vigorously, delivery may be effected. He calls attention to the use of the word "atonic" and considers this as practically the synonym for weak labor pains.

Agents available for increasing the vigor of uterine contractions are preparations of ergotin, pituitrin, and those procedures which, from our knowledge of physiology, we know will irritate muscular fiber to contraction. Some of these are mechanical; others thermic; some chemical, and others electric in character. So far as physiological

¹ Archives mensuelles d'Obstétrique, August, 1915.

² Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 3.

experiments are concerned, electricity is an especially desirable agent. With rare exceptions, however, it is not employed to stimulate contractions of the uterus. Pituitrin is readily given by hypodermatic injection at any period of labor when it is desired, and the writer thinks has the merit of causing uterine contractions followed by relaxation. It is his experience that preparations of ergot given hypodermically are apt to produce tetanic conditions in the uterine muscle.

It has already been remarked that insufficient labor pains cannot cause severe hemorrhage so long as the child is in the uterus and the placenta normally attached. From these results the principle is not to empty the uterus until the uterine muscle has been made to contract. This may also be applied to the treatment of the third stage of labor. So long as there is no hemorrhage, even if the uterus is relaxed and does not contract well, no interference with the womb should be practised. Some of the worst cases of postpartum hemorrhage are those in which, impatient of delay, the physician has rubbed or compressed the uterus to make it contract and expel the placenta immediately after the birth of the child. Weak uterine contractions may not only complicate the stage of expulsion, but also greatly delay the expulsion of the placenta, much to the trial of the physician's patience.

When severe hemorrhage occurs in the third stage of labor, haste is necessary, and mechanical means for exciting the uterus to contract must be immediately used. The writer describes and illustrates a method of bimanual compression of the uterus which he says is of direct practical value. To do this, the finger-nails must be closely trimmed and made smooth. The urinary bladder of the patient must be thoroughly emptied. When the hand, with the fingers brought together, is placed behind the pubes and forced strongly downward between the pubes and the anterior surface of the uterus, the other hand presses the body of the uterus into the pelvis and forces the posterior uterine wall against the promontory of the sacrum. Both hands compress and rub the uterus, and by mechanical pressure, lessen the flow of blood to the organ, at the same time irritating it to contraction. It makes no difference which surface of the hand, placed behind the pubes, is turned toward the uterus, and the operator may consult his own convenience in this regard.

Breiske's method consisted in placing one hand within the vagina against the cervix, and pressing the cervix upward while the other hand, placed upon the abdominal wall, carried the fundus downward and forward. The method described by Zweifel is preferable because the fingers are not placed within the vagina, and hence the risk of infection is avoided. A very clear and practical illustration of Zweifel's procedure is added to the text.

Schroeder introduced the procedure of placing the flat hand behind the symphysis and palpating a uterus to determine whether or not the

placenta had separated. When this was the case, the pressure employed in making the diagnosis would force the umbilical cord out of the vagina. If, however, the placenta was still attached, this maneuver would result in the cord being pulled upward into the vagina.

The effort to control hemorrhage by the use of one hand only is far less efficient, because in this effort the uterus may be carried down into the pelvis and the tendency to prolapse may be brought about. The procedure recommended by older obstetricians of introducing the hand into the uterus and then closing it to form a fist while the other hand made pressure upon the uterus through the abdominal wall, was often efficient. The danger of infection and the pain produced by this procedure prevented it from coming into common use. Elastic bags introduced into the uterus and then distended with normal salt solution are sometimes a useful mechanical stimulus to uterine contraction. They produce their effect by producing pressure which compresses the vessels in the wall of the uterus. The effect is not produced by the contraction of the uterine muscle itself.

That the bimanual manipulation may not be carried on too long, it is useful to alternate this with thermic stimulation, and while the physician may massage the uterus, the nurse or midwife may apply hot and cold water alternately, adding salt to make salt solution. Water without salt dissolves and washes away blood corpuscles and interferes with the checking of hemorrhage, while physiological salt solution does not dissolve the hemoglobin of the blood.

Hot water can usually be found in houses to which physicians are called. In winter, when clean snow or clean ice can be more readily procured, the cold water obtained from this source, to which salt has been added, may be used to excite the uterine muscle to contract. Although the cold salt solution is potent in exciting uterine contractions, most patients much prefer the use of warmth.

As a rule, by some of the methods described, postpartum hemorrhage following deficient contraction of the uterine muscle can be controlled in a quarter of an hour. When after this time, and when the treatment already indicated has been applied, there is still postpartum hemorrhage, this is the result of some internal wound or injury rather than from atony of the uterus. It cannot be denied that from simple deficiency in uterine contractions hemorrhage can occur, but this is rarely the case, while hemorrhage from some internal wound or laceration is unfortunately much too common. Placenta previa has its own special danger and is not considered as an essential cause of atony of the uterus.

When postpartum hemorrhage recurs after the methods described have been employed, the use of Momburg's bandage, compression of the aorta, autotransfusion and the tamponing of the uterine cavity must be considered. Zweifel believes that we have not sufficient data as yet to

fully establish the value of the use of Momburg's bandage and the bandaging of the legs with rubber bandages, constituting the so-called autotransfusion. The writer reports 2 unfortunate cases in which, after the bandage had been loosened, the patient speedily passed into collapse. Evidently, some local means taken to check hemorrhage is much better than ligation of a mass of tissue or compression of the aorta.

In order to prevent a return of postpartum hemorrhage after massage has been employed, the question of tamponing the uterus with iodoform gauze must be considered. Zweifel has never seen a bad result from this method, and is warmly in favor of its employment. It does not, however, invariably check the tendency to dilatation and hemorrhage. Iodoform gauze is not a styptic in the strict sense of the term but works simply as a foreign body by mechanical irritation of the uterine muscle, and as it becomes dry, through the absorption of blood, its power to check hemorrhage is no greater than that of any simple gauze or cotton.

In cases in which iodoform gauze has not been successful, various styptics have been tried, as alum, tannin, and the Kocher-Fonia coagulen. The last is prepared in sterile solution and gauze is wrung out of the solution and then packed into the uterus. In the experience of the writer, no striking effect was produced by this, and it seemed to be much inferior to the liquor ferri sesquichlorati. The official preparation, which contains considerable free sodium chloride and nitric acid, is strongly irritant and was not employed. In place of this, a preparation known as acid-free liquor ferri sesquichlorati was selected. To free the remedy of the acids which it contained, it was evaporated in a water bath and then dissolved in distilled water. In a dilution of 1 to 20, it was unirritating and efficient in checking hemorrhage.

For the use of the obstetrician who desires to carry this remedy with him in his practice, the gauze may be prepared, dried, and carried in glass bottles, or the preparation of iron made soluble and hygroscopic may be taken in powder. When the preparation is needed, 10 c.c. of the dried preparation may be added to 100 to 200 c.c., and gauze soaked in this and then wrung out and used for a tampon. The acid-free solution of ferrichloride has been in use in the clinic for two years in numerous cases in which formerly iodoform gauze would have been employed. No bad result whatever has followed its use. The remedy is an old one and has disappeared from obstetrics largely through the advent of antiseptis. The old preparation was exceedingly irritating, and its use was often followed by necrosis and infection. Zweifel denies, however, that he has ever seen infection follow the employment of the method he describes.

Since the introduction of asepsis in obstetrics, this remedy was also laid aside for some time, and has recently been again put in use. The

removal of the irritating acids from the preparation is of the greatest importance.

When postpartum hemorrhage occurs from large arteries, the liquor ferri gauze must not be employed, but the bleeding must be checked by ligation or by closing by passing a stitch around the vessel. In cases where tamponing the uterus is unsuccessful, it is fair to infer that bloodvessels have been wounded. This may be positively diagnosed when the uterus contracts firmly but hemorrhage continues. In rare cases, wounds of the cervix complicated by deficient uterine contractions may be the cause. When hemorrhage is severe and is not controlled by combined external and internal massage, the obstetrician must seek for the site of hemorrhage. The principal source for these injuries lies in the delivery of the child through a cervix which is not fully dilated. The safest prophylaxis against hemorrhage of this nature lies in the clinical rule not to deliver the patient before full dilatation has been procured. If this does not occur spontaneously, it may be accomplished by elastic bags or when necessary by incisions in the cervix. The worst lacerations are seen where version is performed and the child is rapidly extracted through a partly open cervix. If the body of the uterus is firmly contracted and there is no tear at the entrance to the vagina and hemorrhage still persists, a lacerated cervix must be the cause. The cervix can be readily examined by touch by employing two fingers, one of which is inserted into the cervical canal, while the other compresses one lip of the cervix against the other finger. It is impossible in these cases to tie the individual vessels, as they retract into the tissues of the cervix. They can only be efficiently closed by passing a ligature around them with a curved needle. This is best accomplished by using a speculum and other necessary instruments. If the operator prefers not to employ ligatures, he may use clamps or hemostatic forceps. The ligature is by far the best, because it not only checks the bleeding, but repairs the laceration. It is often difficult, especially in private houses, to have the necessary appliances and assistance to make possible the proper performance of this operation. Zweifel has made it a rule in his clinic to have all lacerations of the cervix immediately closed after labor, and he recommends this simple procedure. If the hemorrhage is annoying, two clamp forceps may be applied to the edges of the laceration, which immediately check the bleeding. The physician may then make, without undue haste, his preparations for applying stitches. This, however, is but a temporary expedient, and stitches may be applied with removing the clamp forceps at the moment of tying. Catgut is the preferable material for such use.

In cases of threatened or actual relaxation of the uterus, the reviewer for many years has followed the practice of manually removing the placenta, if it has not already been expelled, irrigating the uterus with 1 per cent. lysol and firmly tamponing with 10 per cent. iodoform gauze.

The cervix is then drawn down by tenaculum forceps and a thorough examination made to detect laceration, and such is immediately repaired, with medium-sized catgut. The repair of the pelvic floor and perineum, if necessary, is then accomplished, the vagina thoroughly cleansed and moderately tamponed with bichloride gauze. All gauze is removed in from thirty-six to forty-eight hours, and the entire genital canal irrigated with 1 per cent. lysol. No other douche or interference is practised.

This procedure is especially adapted to cases of operative delivery through the vagina with the patient under surgical anesthesia. The same procedure has been carried out by others attached to the Clinic. We have yet to observe a bad result or a case in which infection could be traced to this procedure.

So far as the repair of the cervix is concerned, in 80 per cent. of these cases, primary union occurs; in 10 per cent., partial union; and 10 per cent., practically none.

It is interesting to note that Zweifel recommends a preparation of iron as a styptic within the uterus. The unfortunate results of the intra-uterine use of iron by Barnes, and others, in pre-antiseptic times has led the profession to believe that this substance should never be placed within the uterine cavity. Whether the change which Zweifel describes in removing acids from the compound is the cause of its harmlessness remains to be demonstrated.

Jestaland¹ has studied, in the clinic in Christiania, 20,628 cases of parturition with reference to the occurrence of fatal or severe hemorrhage. The latter he has placed at 2000 grams in quantity. Among these cases there were 5 deaths which may be ascribed to bleeding. Four of these were placenta previa. The fifth was a primipara, aged twenty-one years, who had a normal labor.

Eighty-one of these patients had hemorrhage, not fatal, but more than 2000 grams. Sixty-seven had bleeding between 2000 and 2500 grams; 12 had hemorrhage from 2500 to 3000 grams; and 3 had bleeding which exceeded 3000 grams. Of the 81, there were 28 primiparæ and 53 multiparæ. In 9 of the 81, some obstetric operation had been performed, and 6 of the cases were twin births and 1, triplets. It is the belief of Brandt, at present in charge of the Clinic, that atonic bleeding is so rare that it has very little practical importance, but that most of the hemorrhage which follows labor, occurs because some of the fetal appendages have been retained. When Credé's method fails to control hemorrhage, the hand is introduced into the uterus and the retained material is removed.

THE IMMEDIATE CHECKING OF POSTPARTUM HEMORRHAGE BY COMPRESSION OF THE AORTA. Redmond² calls attention to the practical

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

² British Medical Journal, January 1, 1916.

value of compression of the abdominal aorta for the immediate control of postpartum hemorrhage.

He describes the case of a woman in her second labor. Her first confinement three years before had been terminated by the use of forceps. When she was seen the os was completely dilated and the head about half through the pelvic brim. There were strong and frequent uterine contractions. Very little progress was made.

The patient was given chloroform but not, it is said, to a surgical degree. A long obstetric forceps was applied and a living child delivered without much difficulty. The uterus contracted well under manual pressure, but the placenta did not come away by compression.

Upon introducing the hand, a portion of the placenta seemed to be adherent to the fundus. The entire placenta was delivered without special difficulty. The uterus was manually compressed for about fifteen minutes, until firm contraction resulted and the patient was apparently in good condition. About fifteen minutes later the nurse called the physician's attention to the patient's condition, and the uterus was found to be much distended. Upon making massage, a copious discharge of blood occurred and the uterus again contracted. A hyperdermic injection of ergotamin, $\frac{1}{16}$ grain, was given, and the abdominal aorta was compressed against a lumbar vertebra by the crutch formed by the flexed index and second finger of the left hand, the arm being fully extended and the pressure being made absolute by the tips of the two corresponding left fingers against a lumbar vertebra close to, and in front of, the right. Aortic pulse was feeble, irregular and intermittent, the patient lying in a faint with lips and surfaces white and exsanguine. A physician summoned in consultation gave from 8 to 10 ounces of salt solution into the areolar tissue beneath each breast. Pressure on the aorta was kept up for nearly half an hour, and the patient was able to swallow some warm milk. There was no further return of the hemorrhage.

The patient recovered without complications, was able to nurse the child and to be up and about in twelve days.

So far as our experience goes, there was every reason to expect a sudden and severe hemorrhage in this case. The patient was given chloroform, which predisposes to hemorrhage, delivered as rapidly as possible by forceps, and there is no record that any medicine was given to the patient during the delivery, or afterward, to prevent hemorrhage. Beyond compressing the uterus for a brief period, nothing was done.

It is exceedingly doubtful if the placenta was really adherent. It is not uncommon to find a placenta attached throughout a portion of its substance to one of the uterine cornua. Such a placenta will not readily come away by expression unless the upper angle of the uterus receives especial manipulation. But this is not a truly adherent placenta.

If this woman had been given tonic doses of strychnin during labor,

and if the ergot had been given hypodermically as soon as the child was born and repeated after the placenta was delivered, the relaxation and hemorrhage might have been avoided. If the circumstances were favorable for antiseptic manipulation after the introduction of the hand to remove the placenta, the uterus should have been irrigated with a lysol solution and firmly tamponed with 10 per cent. iodoform gauze.

Compression of the abdominal aorta is recognized as justifiable in grave emergencies. It cannot be long continued, however, and causes severe pain, if the patient has rallied sufficiently to feel pain, and is inferior as a method of treatment to the prophylactic use of drugs or the intra-uterine antiseptic tampon properly applied.

THE IMMEDIATE TREATMENT OF SEVERE POSTPARTUM HEMORRHAGE. Howat¹ classifies postpartum hemorrhage as:

1. Occurring from lacerations of the parturient canal.
2. From retention, partial or complete, of the placenta within the uterus.
3. From inadequate shrinkage of the uterus.

Any two or all three of these conditions may be present at the same time.

The objects of treatment he also describes as three:

1. Immediate arrest of the hemorrhage.
2. The immediately succeeding maintenance of this arrest.
3. Permanent closure of the bloodvessels.

The general principles of treatment are the same for all cases. For the first and second conditions the particular means employed may properly depend to some extent on the severity of the hemorrhage in the given case, and the same means in this case may promote both objects. The third is attained by purely natural means, namely, the formation of a growth of new tissue.

As regards postpartum hemorrhage due to laceration of the parturient canal, the existence of lacerations must be proved by sight or by touch. When this is impossible, such lacerations may be suspected when hemorrhage persists, although the uterine muscle has firmly contracted. This is especially true if the placenta has been completely expelled. The treatment of the hemorrhage caused by the lacerations consists in the application of sutures, or if this is impossible, in the use of a firm tampon.

When postpartum hemorrhage is due to retention of the whole or part of the placenta in the uterus, the bleeding occurs from the open bloodvessels in the uterine wall and in the placenta when the latter is only partially separated. There must be some separation of the placenta to have hemorrhage occur, for while the placenta is completely attached to the uterine wall, the sinuses remain unopened. Normally, contraction and retraction of the uterus simultaneous to the separation of

¹ British Medical Journal, February 5, 1916.

the placenta close by compression the opened uterine sinuses. This is kept up until the blood clots in the sinuses and the clot becomes firm.

Postpartum hemorrhage is possible as soon as the placenta begins to separate. If the uterus fails to contract, but remains relaxed, even if the sinuses have been temporarily blocked, they may reopen and hemorrhage occurs. The later in the process of placental separation the uterus relaxes, the larger is the number of sinuses opened and the more severe is the hemorrhage likely to be. It has often been observed that the most dangerous cases of postpartum hemorrhage are those which begin after the placenta has been delivered.

If there is doubt concerning the retention of placental tissue in the uterus, the placenta should be examined, and if this is not satisfactory, the hand must be inserted within the uterus. When hemorrhage occurs from retained placenta, the uterus may be completely emptied and made to contract efficiently.

Postpartum hemorrhage from relaxation results because the uterine muscle not only fails to contract, but the shrinkage of the uterus due to contraction and retraction of the muscle fibers does not develop. When this hemorrhage and continuance of bleeding precede the expulsion of the placenta, conditions are favorable for checking it. The hemorrhage is evident when the placenta is delivered and hence attention is immediately given to its control.

When, however, hemorrhage begins after the placenta is expelled, the circumstances are favorable for the continuance of the hemorrhage for some time before it attracts attention. There is no pain and if the patient had been put to bed in a supposed comfortable condition, considerable bleeding may occur before the blood is seen. The patient is exhausted from labor and may be only aware of a warm discharge which she does not know is not a normal condition. Such a patient will readily become faint and may be unable to call attention to her condition. In some cases the physician, having delivered the placenta and found the uterus well contracted, has turned his attention to the child, and returning for a final examination of the mother, is amazed to find her in an almost dying condition.

The writer believes that the hemorrhage is in part arterial, and that this is proven by the immediate effect produced by compressing the abdominal aorta. He recognizes the fact that the color of the blood indicates that there is also venous blood present. The arterial hemorrhage results from the circular arteries of the uterus, while the venous discharge comes by regurgitation through the uterine veins made easy by the absence of valves from them and from the veins which they feed. The relaxed state of the uterus deprives the vessels of the muscular compression which mechanically closes them at the placental site; and the adequate retraction and contraction of the uterine muscle fail in these cases.

The conditions which predispose to such an accident are those which were present before labor. Such may be a weakened and impaired condition of the general health and personal peculiarity in the patient, as some women have postpartum hemorrhage after successive labors and any greatly disturbing or depressing factor. A greatly prolonged labor and a very precipitate delivery predispose to hemorrhage. This is seen in some cases when, after a tedious second stage with failure of uterine contractions, a rapid delivery is effected by forceps. In such cases the risk of postpartum hemorrhage is lessened by allowing the placenta to remain undisturbed until the uterus spontaneously contracts.

So far as actual treatment of hemorrhage cases is concerned, it must be remembered that the accident is always a serious one and threatens life. Many of these cases develop in the homes of patients where the facilities for prompt treatment are not at hand, and where there are no skilled assistants. Hospital treatment cannot be carried out in these cases. The methods employed must be essentially primitive in their character. Whatever is done must be done by the physician himself. The condition is one somewhat similar to "first aid" given to the wounded in a case where the precise seat of the wound is not known. Obviously, under these circumstances, the first indication is to immediately stop the hemorrhage. In a severely bleeding wound of a limb, pressure would be made proximal to the bleeding area and local at the bleeding area and the bleeding limb would be elevated.

To treat postpartum hemorrhage, the bedclothes should be immediately removed so that the patient can be absolutely under control. With one hand, the abdominal aorta should be compressed; assistance should be summoned, and the other hand of the physician passed within the vagina. The cervix is grasped with moderate firmness to steady it; the hand over the abdomen, leaving the aorta for the moment, seizes the uterus, compresses it, and presses it down and forward against the vaginal hand, which meanwhile has been closed and moved into the anterior vaginal fornix. The anterior and posterior uterine walls are now pressed against each other by the two hands. If it is thought desirable to make some pressure on the aorta, this can be done at the same time by the back of the wrist of the abdominal hand.

While this is being done, an assistant places a pillow between the patient's head and the top of the bed to act as a protector. As soon as the uterus is firmly held between the hand, the nurse lifts up the patient's pelvis as high as possible, practically to an angle of 60 to 70 degrees with the bed, which is essentially the Trendelenburg posture. The necessary counter-pressure is given by the resistance of the head of the bed to the head of the patient, who now rests on the back of her shoulders, neck, and head. These proceedings may be carried out in less than a minute.

When additional help is obtained, arrangements can be made to maintain the Trendelenburg position by pillows and partly inverting a chair, and using a towel or sheet as a sling from the top of the bed. If the patient's condition is threatening, the arms and legs should be raised to the vertical and held there by assistants. When the uterus is felt to be firmly contracted, and not before, the vaginal hand is withdrawn and a wet pad is applied to the vulva as the hand is withdrawn. As the patient's condition improves, the pelvis is lowered to an angle of 30 degrees and the abdominal hand removed, being returned from time to time to observe the condition of the uterus, and a binder is tightly applied. The patient is kept in this elevated position never less than several hours, her legs being supported in the horizontal posture.

The writer states that he compresses the aorta to prevent the blood from reaching the uterus. This can be done quickly and controls almost the entire arterial blood supply of the uterus. As the uterus is relaxed and filled with clots, the pressure made upon the aorta will also reach the body of the uterus, and excite it to contract. It has been proposed to compress the inferior vena cava at the same time, but the writer does not favor this.

Bimanual compression of the uterus occludes the open channels at the placental site, by pressure empties the uterus of blood and stimulates it to contract. He cites bimanual compression of the uterus with one hand within its cavity, but believes that the method which he describes is far less dangerous and more efficient. He lays special stress on the raising of the pelvis and practically claims priority and originality for this suggestion.

It is extraordinary to observe that a physician who states that he practises obstetrics in the houses of the poor with little assistance should apparently neglect the prophylactic treatment of postpartum hemorrhage. It is just such cases which, in our out-patients among the poor, are managed with special caution to prevent hemorrhage. Certainly no physician would undertake general practice without a well-equipped hypodermic syringe; tablets of strychnin would also form a part of his outfit. The obstetrician would, in addition, have pituitrin and ergot available for injection; many still prefer to rely upon fluidextract of ergot given by mouth. Many mothers among the poor are exhausted by repeated childbirth, and easily fail from the muscular fatigue of labor. If strychnin and ergot be given as soon as the child is born, and before any effort is made to deliver the placenta, a very important measure is taken to prevent postpartum hemorrhage. This dose may be repeated to advantage as soon as the uterus is emptied. If a sudden gush of blood indicates a quick uterine relaxation, pituitrin is indicated. We believe that the most successful treatment of postpartum hemorrhage lies in prophylaxis, and certainly the remedies described are

accessible to any intelligent physician. Experience shows us beyond discussion that the obstetrician should never wait for the occurrence of postpartum hemorrhage, but that the danger of this accident should be in mind as soon as he takes charge of a confinement. We have made this a rule in a very considerable number of confinements, with the best results.

The method of treatment described is open to the criticism that the hand is introduced hurriedly within the vagina without adequate disinfection, no mention being made of the use of a sterile glove. We should fear infection in such hasty intra-uterine manipulation.

There can be no criticism of compression of the abdominal aorta, provided the effort is not made to continue this pressure too long. Momburg's bandage is the most efficient method of holding the abdominal aorta, but experience shows that this causes intense pain and can be tolerated less than half an hour.

There are other methods of bimanual compression of the uterus without placing the hand within the vagina. If the urinary bladder be completely emptied, one hand can be carried down behind the pubes and the relaxed abdominal wall, while the hand above the anteverted uterus compresses it downward upon the lower hand upon the pelvic brim. The writer gives little importance to rapid massage of the uterus and pressing out the blood-clots which have accumulated in its cavity.

We fully agree with him that where the surroundings do not permit antiseptic technic, the physician must do the work himself, but it is exactly under these circumstances that we should hesitate to introduce the non-sterile hand within the vagina.

In cases in which a trained nurse is in attendance, and where reasonable facilities are afforded for antiseptic practice, we have found three simple procedures efficient in controlling postpartum hemorrhage.

1. Rapid massage of the uterus, followed by compressing and anteverting the uterus with the hand upon the abdominal wall.

2. The hypodermic administration of strychnin sulphate, $\frac{1}{10}$ grain, and one syringeful of antiseptic ergot, or in place of strychnin and ergot, 1 ampoule of pituitrin.

3. A copious hot vaginal douche of sterile water or lysol, 1 per cent.

In the Maternity Department of the Jefferson Hospital, these three procedures are carried out by the nurse as soon as hemorrhage is discovered and without further direct orders. They invariably succeed in checking the hemorrhage.

For the complete control of uterine relaxation, the intra-uterine tampon with 10 per cent. iodoform gauze is especially valuable. This, with hypodermic medication, is usually successful. In a few cases in which the womb still dilates, the application of the interrupted electric current, one pole over the uterus and the other over the epigastric or lower spinal region, is very efficient.

The foot of the patient's bed is always elevated in cases of severe hemorrhage, and most hospital beds are so made that the foot can be elevated without disturbing the patient or altering the bed essentially. We have been accustomed to use the Trendelenburg posture for hemorrhage with good results.

The writer mentions a case in which, after a tedious labor, the forceps are used to rapidly deliver the child. We think that this is done in direct violation to one of the cardinal rules which should govern delivery through the vagina. The rule is this, "Do not empty through the vagina a uterus which is not contracting." In a recent paper quoted in this issue of *PROGRESSIVE MEDICINE*, Zweifel, of Leipsic, emphasizes this rule which has long been followed upon the Continent. When labor comes to an absolute stop from exhaustion and hemorrhage is not present, the patient should first receive opium to give her rest and allow her to recuperate. Uterine contractions will usually develop after a brief period of rest, but if rest does not bring uterine action, then tonic doses of strychnin, with a small quantity of alcohol, will produce the desired result. When the uterus begins to contract, anesthesia skilfully administered with ether or nitrous oxide and oxygen, gradually delivering by forceps, will give the best chance.

In such a case the obstetrician should not wait for hemorrhage. After the placenta has been expressed, a hot intra-uterine irrigation of 1 per cent. lysol should be followed by firm packing of the uterus with 10 per cent. iodoform gauze. After this comes the repair of the lacerations of the cervix, pelvic floor or perineum, terminating with a vaginal pack of bichloride gauze. He carries the cervix backward and thus secures, as soon as possible, anteversion of the uterus. Hypodermic stimulation should then be given as required. If these precautions be adequately carried out, cases of hemorrhage after forceps delivery will be very much lessened.

The Prevention of Puerperal Mastitis. Strassmann¹ calls attention to methods commonly proposed for the prevention of puerperal mastitis. There is probably no more common method of treatment than the application to the nipple of alcohol or brandy. This is done upon the theory that the epithelial covering of the nipple is made tough and hard so that cracks will not readily occur and infection cannot enter the breast. It is thought by some that the alcoholic preparation disinfects the tissues as well. The materials employed consist in alcohol in varying percentages, brandy, rum, and, in some cases, wood alcohol. Among ignorant persons this is applied to the nipple with the finger or hand with cotton or flannel, or in some cases, the nipples have been known to be brushed with an ordinary nail-brush or even with a tooth-brush and with such violence that oozing of blood follows. The alcohol prepara-

¹ Zentralbl. f. Gynäk., 1915, No. 21.

tion has been used night and morning during the last months of pregnancy.

Nothing could be more injurious or more likely to be followed by disaster. The continual hardening of the epithelial covering predisposes to cracks and fissures, and any violent cleansing of the nipple must be followed by lesions of the epithelial cells.

Substances which soften the epithelium are also disadvantageous. Such are glycerin, either alone or mixed with alcohol, or with various preparations of alcoholic substances. The result of this treatment is to cause numerous small cracks and fissures in which staphylococci may reproduce and thus form the beginning of an abscess. In these cracks and fissures bacteria can readily gain access to the acini of the breasts.

The best and most rational treatment of the nipples during pregnancy consists in very gently cleansing them with cold water with as little disturbance as possible, and using very soft clean material. The nipple is then gently dried with a soft towel or handkerchief, and pure lanolin is applied. This keeps the natural epithelial covering in good condition and promotes the growth of healthy epithelia. During the puerperal period care should be taken not to wound the nipples nor to destroy the natural methods of protection. It is best after the child nurses to use no water upon the nipple. When the nipple is cleansed with a watery solution before and after nursing, this may be done from ten to fourteen times in twenty-four hours. The skin becomes macerated and the epithelia readily removed. When we stop the application of watery solutions, the epithelia very soon reforms. A similar experience is observed by veterinarians where the udders of cows that are thoroughly washed frequently during the day gradually become tender and wounds of the teats frequently develop.

After the child is nursed, the best method of procedure consists not in the use of a watery solution, but in applying ointment so that the skin may retain its natural consistence. An ointment composed of balsam of Peru with 2 to 5 per cent. resorcin is useful. Before the child nurses, the nipple should be very gently but thoroughly cleansed with sterile cotton dipped in water which has been boiled. All disturbance of the nipple and any violent handling is to be strictly forbidden.

The most important of all precautions is frequently the most difficult to obtain, namely, that the nipple shall not be molested unnecessarily by anyone. Among ignorant persons, it is impossible to lay down rules, and even the application of sterile dressings with binder to hospital patients is not always possible. Such persons will loosen the binders, remove the dressings, and finger the nipples as they see fit.

It is sometimes desirable to press fluid out of the breast to observe the character of the secretion. When this is to be done the nipple should never be touched. The surface of the breast should be cleansed and made aseptic, and sterile hands should be laid upon the breast

broadly with thumb and fingers surrounding the areola but at a little distance from it. Very gentle pressure should then be made toward the nipple, when fluid, if present, will emerge. Under no circumstances should the nipple be taken between the thumb and finger, as is so frequently done.

OBSTETRIC SURGERY.

Teaching Obstetric Operations. In the *Zentralblatt f. Gynäkologie*, 1915, No. 25, Holzapfel contributes a paper upon this subject. He has had considerable experience in teaching obstetric operations, and while methods are essentially the same, he believes it to be valuable to publish the practical points which should be brought forward in a competent course.

He thinks it is essential not to give the student too much and too complicated material in his instruction; that the teacher should confine himself to that which is practical and thoroughly within the grasp of the student. The beginner in obstetric surgery tries to memorize the various points concerning an operation after a definite scheme, and also the accompaniments and complications, so that he may the more readily carry it in mind. In so common a matter as the use of the forceps, the writer does not think it of the greatest importance that the student be taught to grasp a forceps blade with the left or right hand, or the precise way in which the hand rests upon the blade, but that it is of the utmost importance that the forceps be taken with a very light grasp. He personally demonstrates the taking of the forceps blade in as light a grasp as he would a pen or pencil, and lays emphasis upon the fact that force must never be violently employed in the use of the instrument. He also believes, in teaching the use of the forceps, that it is exceedingly important that the beginner be thoroughly drilled in the precise direction in which the blades are to be inserted; thus, instead of saying the blade is to be passed up along the side of the pelvis, he would say the blade is to be passed on the left side and up along the pelvis. His constant effort is to emphasize in the mind of the student the location and direction of the blade with reference to the body of the patient, not with reference to external objects or to the operator himself. It is not uncommon to have teaching concerning the forceps entirely misunderstood, because teachers fail to convey the exact impression concerning the precise maneuver described. He believes that this can be avoided if, in describing the application and direction, it is always done with reference to the body of the patient. Thus, in describing an incision as the operator stands upon the left of the patient, he would invariably describe the incision as proceeding from below upward in the median line, and not with reference to the left or right side of the patient. It is not uncommon to find a great deal of confusion in the minds of students because this precaution has not been followed.

In cases in which the head is not rotated, and it is necessary to apply the forceps obliquely, care must be taken to emphasize the oblique direction of the diameters of the pelvic brim. As the student faces the pelvic floor of the patient, as the head has not rotated, he may imagine that the line of application is across the pelvic floor. The student must remember that the long axis of the vulva corresponds at the moment of expulsion with the sagittal suture of the child's head.

In teaching the application of the forceps, the writer is accustomed to emphasize which blade comes posteriorly in the oblique application. This may be made plain in two ways: The function of the posterior blade is to facilitate the anterior rotation of a presenting part, so this blade is always applied to that side of the pelvis through which the presenting part is to rotate. So, when the occiput is behind, it is usually upon the right side, and the posterior blade is applied upon that side; the anterior naturally on the opposite.

The second maneuver is to hold the forceps closed in front of the vulva with the point of the forceps directed toward the presenting part. In this way the student can the better understand which blade is to go posteriorly and which anteriorly. It is, of course, remembered that the closed forceps with its long axis is to gradually approach the median line, and that the tip of the forceps blade is continuously passing toward the front. If the forceps blade was to remain exactly at the side of the pelvis, the tendency would be for posterior rotation.

When the first blade of the forceps inserted does not take a secure grasp, the writer is accustomed to hold it, or to allow it to be held by a student and demonstrate the fact that when the blade is properly inserted in the living patient, it retains its position without help. It should not be necessary for the operator to maintain the first blade of the forceps in its proper position. If the hand holds the blade, the tendency is for the fingers to spread and to come in contact with the patient's anus. This might predispose to infection.

The writer does not believe that it is a wise plan to apply the forceps in teaching students in various diameters and directions. The axis in which the forceps is to make its traction is not bent at a right angle but is in a curve, so traction upon the forceps which quickly changes in direction must carry the head of the child against the wall of the pelvis, and it is very easy for the beginner to make traction too long or too short a time in one direction. The writer emphasizes the fact that in using the forceps the head must be brought down in the axis of the pelvis in the living patient. It is taken for granted that the scholar understands that at least a normal capacity of the pelvic cavity is required for the head to pass. If traction be made in the axis of the living birth canal, the anterior rotation of the presenting part follows as a natural consequence.

The writer believes it important, in demonstrating the forceps, that

one hand should rest upon the lock and direct the forceps more or less directly backward. If traction is made upon the handles, the head will always be carried much too far forward. The higher the head is in the pelvis, the more important is the backward traction at the lock. In the high application of the forceps, this pressure made at the lock is virtually an axis traction. It is always useful when the head is in the pelvic cavity, when a very long and resistant perineum may be forcing the handles too far in front. It is necessary in all vertex presentations and absolutely essential in face presentation.

The writer is accustomed to warn students against lateral and lever movements with the forceps. Up-and-down motion of the blades is also absolutely prohibited. Beginners often think they can do better by sitting just as they terminate delivery by forceps instead of standing. The handles of the forceps are often carried strongly to the front with the result that lacerations are caused in the anterior segment of the pelvic floor.

The most important lesson which can be taught the pupil is naturally to deliver the head when the vertex presents. If the principles of this ordinary delivery are mastered, the rest becomes comparatively simple. In delivering the vertex anterior, so soon as the hair upon the fetal scalp is visible, the traction should be strongly directed in front until the head with its small diameter has virtually emerged. Traction should be continued upon the head until the glabella appears, when its gradual extraction is no longer difficult. The posterior rotation of the occiput which is said to occur when one waits until the scalp appears before changing the direction of the forceps, the writer has never seen. He does not believe in making many positions for the various presentations, but thinks it best to keep the matter as simple as possible, and to retain the two first and second positions.

He believes it to be very dangerous to attempt to rotate the chin when directed posteriorly to the front. When there is difficulty in securing anterior rotation of the chin, he believes that single or double episiotomy may be indicated.

He does not believe in removing the forceps before the head is born. The presence of the instrument does not increase the circumference of the fetal cranium and the thickness of the forceps blade does not greatly increase the size of the mass which is to pass through the vulva, and the operator can never be sure that by moving the forceps the head would immediately emerge.

In cases of transverse position, shoulder presentation and breech presentation, the hand which is opposite the essential parts of the fetus is the hand most concerned in the delivery. When the back is directed posteriorly in transverse position, the writer prefers to grasp both feet in performing version. He likes especially to make traction upon the inferior foot. In performing version for transverse position, he passes

his hand first to the breech of the child and then along the sacral region and the thigh. The grasp upon the fetus is much more secure if this be done.

In cases in which version is attempted and both feet have been grasped and difficulty has been experienced, he places the mother upon the side. When the patient is anesthetized and placed upon her side, version is often easily performed. The double hand grip of Justine Sigimundin then becomes superfluous.

When the breech presents and it is necessary to deliver the child by traction, he makes traction upon the body in such a manner as to dilate the pelvic floor as greatly as possible. This is done to secure an easy passage of the after-coming head.

If the thighs of the child present, they should be brought down so that a footling presentation results. One should not attempt to bring the breech through the brim of the pelvis if it is not indicated. When descent is hindered, the best instrument for bringing down the breech and thighs is the finger. Where this does not suffice, the blunt hook may be cautiously employed. If the fingers become fatigued it is best to change the forefinger, or the thumb and little finger. When one cannot reach the breech sufficiently to hook the finger into the groin but can succeed in passing a rubber tube, which has been oiled, over the pelvic brim of the child, the rubber tube should be drawn over the blunt hook and this may be cautiously applied to bring down the breech.

In cases in which the back of the child is directed posteriorly and the feet and legs are born first, the effort should be made, in making traction, to cause the back to rotate anteriorly.

In endeavoring to free the arms, when breech presentation is present, one should bring them down across the anterior surface of the child's thorax.

In preventing lacerations, the head should not be allowed to pass too rapidly, and just before and during the time that it is passing over the thinnest portion of the perineum, the pelvic floor should be carried gently backward. This may be done with the thumb and finger to advantage. The perineum can best be protected if the patient lies on her left side with the thighs and legs flexed. The obstetrician stands at the side of the bed with his back directed toward the patient's head. In the application of forceps, it is best to apply the hand broadly across the pelvic floor at the moment when the child's head is extracted. It is unnecessary to make firm pressure upon the pelvic floor during forceps extraction.

When the pelvic floor is very resistant, the parts may be dilated with the hand, and small incisions made near the raphe, which are more easily closed with sutures than incisions made at the side. Episiotomy, single or double, should only be practised when there is danger of tearing through the sphincter.

The writer is strongly opposed to introducing the finger into the rectum during the passage of the head, believing that the danger of infection from this procedure is very great.

Regarding the *tying of the umbilical cord*, the general advice is given to wait until pulsation ceases, so that the child may obtain the greater quantity of blood from the placenta. The writer has tried to trace the connection between these, and is unable to find any good ground for it. The disturbance of the pulse in the cord depends upon the conditions in the walls of the arteries in the cord and upon the blood-pressure in the umbilical vessels. This is influenced very much by the blood conditions in the fetus, and is greatly changed by the first respiratory movements which admit a large quantity of blood into the pulmonary circulation from the placenta and from the general circulation. These changes do not take place so rapidly or so markedly that the cessation of the pulse in the cord indicates their complete accomplishment. When the child is vigorous and breathes strongly, one can often observe that the umbilical pulse continues after respiration is established. Frequently, in children who breathe badly, the pulse in the umbilical cord disappears. The writer believes that no attention should be paid to the fact that the pulse is or is not beating in the cord when it comes to the question of ligating the cord. The breathing and crying of the child are the most evident indications that all is right. The cord may be tied as soon as the child has cried or breathed well, and if possible, during its crying. As a rule the child's first cry comes within five minutes after its birth, and this time may be utilized in freeing the mouth and nose from mucus and amniotic liquid.

It may be asked whether it makes, in the interest of the child, any difference whether the child receives much or little blood from the placenta. Still the child's development is independent of this, for one often sees a child growing normally who may have had a severe hemorrhage from the cord at the time of birth. If the child has really lost considerable blood, it will become jaundiced. The writer has followed the method of ligation which he describes for eighteen years without seeing a bad result for the child.

Cesarean Section upon the Dead. Burian¹ reports that, in Rubeska's Clinic in Prague, since 1896, Cesarean section upon the dead has been performed six times; in 5 the result was negative, and on 1, positive. This child was born within twenty minutes after the death of the mother and survived in good condition. This operation should be performed when pregnancy has reached twenty-eight weeks, and when the child can be delivered within twenty-five minutes after the death of the mother, when its rapid delivery through the vagina is impossible. It is not necessary to plainly recognize the beating of the fetal heart.

¹ Zentralbl. f. Gynäk., 1915, No. 25.

To decide upon the operation, a consultation should, if possible, be summoned; the fetus must certainly be living, and the relatives of the mother must give their consent. If the mother is conscious, she may also indicate her wish.

There is another important element to be considered, not mentioned by the writer who is quoted. In estimating the value of the operation, it must be kept in mind whether the fetus shares in the disease from which the mother is dying. Thus, in mothers dying of eclampsia, the operator delivers the child at the moment of death, but may be disappointed to have the child die within two weeks from toxemia. Such has been the experience of the reviewer, although the child was unusually large and vigorous, and had a healthy wet-nurse.

In the service of the Maternity Department of the Jefferson Hospital, a consultation was recently sought on a woman pregnant at term and dying with pulmonary tuberculosis in the department of the hospital adapted to tubercular disease. It was decided not to induce labor, for the mother was suffering, and seemed to be afraid of interference. As the case was rapidly drawing to a fatal conclusion, it was determined to wait and perform postmortem section. For this, the consent of the husband was obtained. The operation was done, and a feeble, ill-developed child at term was delivered. This was treated by incubation and artificial feeding, and the child, although at birth it weighed a little over 3 pounds, has gained slowly but steadily.

The apparent success of this operation lies in the fact that the cases in which the newborn child is affected seriously with tuberculosis are exceedingly rare. If tuberculosis develops in the infant, some weeks or months usually elapse after birth. While the ultimate fate of this child is in doubt, it has lived between five and six months, and is slowly gaining, which justifies the operation.

The Induction of Labor. In the *American Journal of Obstetrics*, May, 1915, a Committee of the New York Obstetrical Society composed of Drs. Kosmak, Beach, Ford, and Wilbur Ward, reported to the Society the end-results for one year of the induction of labor on mother and child. The object of this committee was to give to the society a comprehensive and unprejudiced statement concerning this important obstetric practice. It was hoped that information could thus be obtained which would permit a comparison of the conservative methods of terminating labor in contrast to those of a more strictly operative character. To the members of the society, a questionnaire was sent asking for information concerning the induction of labor in the experience of its members.

Information was contributed concerning 293 cases. In 2 labor was induced before six and a half months, the fetus not being viable. In most of the reports nothing has been stated as to the results at the end of a year relative either to the mother or to the child. While this is

unfortunate, it can scarcely be considered remarkable in view of the difficulty experienced in tracing hospital patients.

The average age of the 293 patients was 28.24 years; the youngest fourteen, the oldest forty-two. In 118 the patient was a primipara; in 73 there was a previous child; in 97 cases two previous children; in 66 cases three previous children. In 29 cases there was a history of previous stillbirths from operative or other causes.

In reviewing the indications for the induction of labor, only the cases in which the child was viable were considered. From the stand-point of the mother, pelvic deformity was an indication in 52 patients. The period of gestation at which labor was induced varied from thirty weeks to what was believed to be beyond the time of normal labor. In 232 cases the child was born living; in 61 stillbirth resulted, one child dying on the fourth day from hemophilia. In analyzing the cases of stillbirth, it is difficult to trace the factors which produce it. In 1 case craniotomy was done. The average weight of the children born by induced labor in cases of contracted pelvis was, at the time of delivery, 6 pounds 6 ounces.

Labor was spontaneous in 29 cases. There were 5 low forceps; 5 versions with breech extraction; 2 simple breech extractions; 1 Cesarean section; 1 craniotomy. In the spontaneous labors, 27 children were born living and 2 dead. In the deliveries by operation, 17 children were born living and 6 dead. Here the method comes in direct contrast to Cesarean section at term.

In deciding which method is productive of the best results, several factors must be considered. These patients were confined within the city limits with hospitals at hand, and the question is different from that which must be solved in the country where it is difficult or impossible to obtain hospital accommodations. The environment of the patient and the facilities at the disposal of the doctor play a large part in the final issue. If one does not let the patient go to term, one can never be sure of the actual size of the child and the relative proportion of the fetal head and the mother's pelvis. The previous history of the patient, if she is a multipara, is not decisive, for patients have had a Cesarean section in the first pregnancy for contracted pelvis and subsequently have given spontaneous birth to a child because the head was smaller or more readily molded to the pelvis. When the facilities of a modern hospital are available, it would appear that the average patient with contracted pelvis should be allowed to go to term and given the test of labor.

In 3 cases, fibroma, ovarian cysts, and other growths in the pelvis furnished the indication for inducing labor. As no series of similar cases is available for comparison, this particular class requires no further attention. This objection might, however, apply to the induction of labor before term where tumor has blocked the pelvis. When pelvic

tumor complicates pregnancy, it may be very difficult to estimate the size of the fetus, but as movable tumors are often pushed out of the pelvis by the contraction of the uterus, in such cases it would seem best to await the test of labor.

In 89 cases constitutional conditions were the indication. Heart disease in 9, 5 living and 4 dead children; tuberculosis in 3, 2 living and 2 dead children (twins); toxemia, 50 cases, with 1 maternal death, 28 living children (twins twice) and 24 dead children; eclampsia in 9, no maternal deaths, 4 living and 5 dead children; nephritis in 9, 8 living and 1 dead child; pyelonephritis, 3 cases, 3 living children; accidental hemorrhage, 3 cases, 2 living children; meningitis, 1 case, mother died, child survived.

It is difficult to distinguish between toxemia, eclampsia, and nephritis. If all be grouped under toxemia of pregnancy, we have 68 cases treated by induction of labor, with 1 maternal death; 30 deaths of children. As these children were premature, the general result is fairly good. In the severer cases the number of fetal deaths in 9 was 5, or more than 50 per cent. While the number of cases is too small to furnish a positive judgment, the fact that but 1 mother out of 68 died is worthy of note.

In 118 cases some factor connected with the fetus was the cause for the induction of labor. Excessive size of children, 62; hydramnios in 5; placenta previa, 28; monsters, including hydrocephalus, 1; premature rupture of the membranes, 17; dead fetus, 5.

Dilating bags were employed in 244 cases: Voorhees, 240; Pomeroy, 4; almost to the exclusion of other procedures. Gauze packs in 10 cases; bougies and gauze in 6; gauze and bags in 12; gauze, bags, bougies and manual dilatation in 9; gauze and manual dilatation in 1; manual dilatation alone in 3; rupture of the membranes in 5 cases. It is difficult to obtain any definite estimate as to the time required before the onset of pains. In 35 cases two bags were required; in 4 cases, three. In 1 case the pains began within half an hour after the bags were inserted, and in another forty-eight hours elapsed before pains came on. Although in many cases there was no record of pain, the cervix dilated readily to the size of four fingers, rupture of the membranes, and the administration of pituitrin brought labor to an end. The pains were usually irregular and often ceased after the expulsion of the bags. The operators differ greatly in their use of the bags; in some instances they were left in for prolonged periods until expelled; in others, a fresh bag was inserted so soon as dilatation by the preceding bag had become complete. In a very few cases the first bag failed to elicit pain and gauze packs were used, and sometimes rupture of the membranes and manual dilatation. One operator gave strychnin and quinin frequently, but gives no estimate of their value. The results seemed to be the same whether drugs were employed or whether they were not employed. In a few

cases, when dilatation of the cervix was practically complete, pituitrin is mentioned; in 1 case even 2 c.c. of pituitrin failed to produce contractions. The gauze pack seemed to delay the progress of labor, and the Braxton Hicks version was done in a number of these cases. The gauze pack does not seem to have been very efficient in producing labor pains.

In 293 cases delivery was effected by operation in 135; forceps, 78; version, 45; craniotomy, 2; breech extraction, 12; Cesarean section, 1.

The child was born living in 232 cases, 15 living twins; stillborn in 61 cases, 1 twin stillborn. Twelve children lived only a short time. The weight and development in 255 was an average of 6 pounds 6 ounces. There were few cases of asphyxia.

There was no real postpartum hemorrhage except in a case of placenta previa. Lacerations of the cervix and perineum were limited to first-degree tears; in one instance, after version, there was a third-degree tear.

The temperature rose above 100° F. in 27 cases after delivery. Before induction of labor, rise of temperature was present in 2 patients. Puerperal sepsis existed in 2 cases, 1 of which died; 12 died after version for placenta previa. From the comparatively small number of cases with temperature, it seems probable that the induction of labor by conservative methods did not result in severe infection. Where any marked rise of temperature was noted, there had been operative delivery, or some intra-uterine manipulation aside from the insertion of bags had been employed.

Among the complications caused by the bags were prolapse of the cord and hand in 2 cases; prolapse of the cord alone in 3; change from vertex to transverse in 1, and in 1 from vertex to shoulder.

As regards the final results for mother and child, in only 85 cases could the condition of mother and child at the end of a year or longer be observed. The physical examination was reported in only a small number, and the general statement refers to the fact that the mothers were living at the end of a year and that no condition could be found attributable to the induction of labor. Among the 85 cases which were followed up for a year or longer, 53 of the children were reported living and well. One died during the first year from enteritis; 10 soon after birth from various causes including hemophilia in 2; there was cerebral hemorrhage in 2, and in the remainder no direct cause was given, but prolonged labor was the probable factor. In this series there were 20 stillbirths, making a total of 86 children, including 1 case of twins.

The committee feel justified in concluding that the inquiry was not fruitful of satisfactory results. So far as the mother was concerned, the results of induced labor for the conditions noted under the circumstances reported had been excellent. In no instances could either a maternal death or any other ill-effect be attributed to the operation.

As regards the fetal life, no definite conclusions could be drawn. Among the cases of stillbirth or dying soon after birth, it would seem that the operative delivery had as much to do with the death as the induction of labor. In cases of toxemia, prematurity plays an important part, although even some of these children survived. Evidently more definite detailed information is needed before conclusions can be drawn which would admit of a comparison of the conservative delivery of a woman for the conditions enumerated and those of a more radical nature, including delivery by section.

In opening the discussion, Holt stated that it is impossible for anyone following children in private practice to get a sufficiently large number of cases delivered by induced labor to furnish statistical material. At present, a baby weighing 6 pounds 6 ounces, if in good condition at birth, does not usually give the pediatricist great trouble. With good care such a child should not only survive the first year but come through it in good condition. At the Babies' Hospital, a premature baby in good condition weighing $4\frac{1}{2}$ pounds has a fair chance of living. If the weight is less than 4 pounds, the prognosis is bad, although exceptionally children weighing as little as 3 pounds do well. It is especially important in these cases to establish maternal nursing.

When such children are admitted to the hospital and the mother is not with the child, it is difficult to keep up the supply of milk in the mother. If by nursing another child, this can be accomplished for a few days, the mother may then be able to come to the hospital and nurse the child. In most instances she can take the child home after six weeks, and continue nursing it. When the mother loses her milk and attempts artificial feeding at the end of a month or six weeks, the results are bad. In the interest of the child after it is taken home, every effort should be made to continue the mother's nursing. A child weighing $6\frac{1}{2}$ pounds, uninjured at birth and whose mother did not have any form of toxemia, if born in good condition should, under the present hospital care, be reared in almost every instance. The critical period is the first month. Nursing every two hours is nursing too frequently.

The infant mortality in New York City is steadily diminishing and has improved in recent years nearly 300 per cent. A study of the statistics shows the deaths prevented during the first year are not simply deferred until the next year. Of infants' deaths occurring during the first year, 33 per cent. are in the first month, 22 per cent. in the first week, and 13 per cent. in the first day of life.

Regarding the use of the small incubator, there is danger of asphyxia, and it is necessary to keep a cylinder of oxygen at hand with which to revive the baby. It is also difficult to maintain a uniform temperature, and there is constant danger of infection. In place of this, premature infants are kept in a moderately warm ward with a temperature of 70° to 75° F., and heated by electric pads and hot-water bottles

placed about them. This gave some improvement but was not satisfactory. A special room constructed for the care of premature children is about 24 by 16 feet and 10 feet high. It has double walls, partitions, and windows; special ducts for the intake of fresh air, which go above the roof of the building. This air is warmed by passing through a coil of pipes and then comes into the room. An electric fan for ventilation is placed in the duct. This room has been in use for six years successfully. To guard the small infants from infection, no one except those engaged in their care is permitted to enter the room, and the children are disturbed as little as possible. The room accommodates six children, giving each child 300 cubic feet of air. A temperature of from 88° to 90° F. seems to be the best for the first two weeks; then 80° to 85° F., and before they are discharged from the hospital they are put in a room with a temperature of about 75° F., where they are kept for a week or so. Breast milk entirely is given them for four or five weeks, then mixed feeding. It is not necessary that the milk should be of the same age as the child. Women can nurse premature babies successfully whose children are eight and nine months old. At first this milk is diluted with a solution of 1 part breast milk and 2 parts water or barley-water. The amount given at each feeding is at first 2 to 4 drams every three hours. An effort is made to have them take the breast as early as possible, and by the third or fourth week this is usually successful. A child under 3 pounds in weight occasionally survives, but few are admitted who weigh as much as 5 pounds. Many admitted are so feeble that they die in a few hours. A nursery maid in training is competent for taking care of these children.

It is vitally important that these children do not become infected, and that infected persons are kept from them. If a nurse has a cold in her head she is not allowed in the room. The difficulties from otitis, bronchitis, and pneumonia are very great, and even from a cold in the head serious disease may develop. These children are not bathed, but are carefully cleansed with olive oil on pledgets of cotton. They are handled as little as possible. The most usual mistake in the care of such infants is in overfeeding.

It is often thought that feeble digestion is inherited. There is much in heredity that must be recognized, and the nervous makeup of the parents has much to do with the condition of the child. The nervous system of the baby has an important part in furthering or hindering its growth.

Cesarean Section. EXTRAPERITONEAL CESAREAN SECTION FOR TRANSVERSE POSITION. Küstner¹ considers an impacted transverse presentation one in which the child is so firmly grasped by the uterine muscle that version is no longer possible. The amniotic liquid has long

¹ *Zentralbl. f. Gynäk.*, 1915, No. 31.

since escaped, and uterine rupture is threatened if any manipulation attended by force is undertaken. The contractions of the uterus which compress the child also interfere with the circulation of blood through the placenta and speedily cause the death of the fetus. Children born after this complication very seldom breathe. When the fetus has perished, the indication for treatment is comparatively simple. Rachiotomy is the operation of choice. To avoid rupture of the uterus, operators have, in such a condition, resorted to delivery by section. If, as is rarely the case, the child should be living, its delivery by a suprapubic abdominal incision is indicated. The extraperitoneal method is considered safest for the mother. Some operators assert that other methods are as safe as extraperitoneal section, but the writer is not of that opinion.

His case was that of a woman, aged twenty-three years, who, seven years previously, had the appendix removed and, two years before labor, an umbilical hernia closed by operation. About two years before the present labor, she gave birth normally to a child. She had come to the end of the present pregnancy and the membranes ruptured before labor was advanced. Prolapse of the hand followed and an attempt was made with a dilating bag to increase dilatation. This failed, but it was said that no attempt had been made to perform internal version.

When admitted to the clinic, the patient was a vigorous, well-nourished woman of average size, the child being in a transverse position with the back posteriorly and the head upon the mother's right side. The uterus was not extraordinarily wide, so that the child was flexed laterally and strongly bent upon itself. The head was on the right side near the fundus, the breech and feet upon the left. The heart sounds could be plainly heard, varying in frequency and somewhat indistinct. The external os was dilated to 5 or 6 cm. and the cervix had not become obliterated. In the cervix was the right arm of the child. The uterus was tightly contracted in a tonic condition. The temperature and pulse of the mother were normal and she was not greatly disturbed by the condition. In the interest of the child, the prompt ending of the labor was clearly indicated. If delay was practised, the child must surely perish. The condition of the cervix and contraction ring made internal version impossible. The contracted state of the uterus forbade vaginal Cesarean section, for, if the operator has through the vagina split the cervix, he must still have been obliged to perform version and the danger of tearing the uterus would have been very great. Abdominal Cesarean section was indicated, as the feet of the child could be thus most easily grasped and the delivery of the child accomplished with the least shock and disturbance. An incision was made upon the left side by the extraperitoneal method over the feet of the child. The peritoneum was pushed backward; the cervix was found exceedingly thick but was incised without especial hemorrhage. The effort was made to grasp

the child but found impossible and it was necessary to enlarge the uterine incision upward, when a second effort to introduce the hand and turn the child was unsuccessful and the incision was again prolonged through the contraction ring. The operator was fortunately able to avoid opening the peritoneum. The right or the underneath foot was grasped and with great difficulty the child was very slowly turned. It was exceedingly difficult to extract it through the incision, as the thighs were placed abnormally, but finally the operator succeeded in bringing the breech into the uterine wound. In extracting the child, one of the thighs was fractured. The fetus was 50 cm. long. The umbilical cord was not pulsating nor was the heart beating. The placenta was delivered fifteen minutes after the extraction of the child. The large incision of the uterus required 22 sutures for its closure and a vioform gauze drain was left in the lower end of the abdominal incision to drain the uterus as well. A permanent catheter was placed in the bladder, as the bladder wall had become considerably thinned by pressure. The patient's recovery was uncomplicated. The fact that the thighs and legs of the child were in an abnormal position in relation to the trunk made its delivery after section very difficult. The writer, however, doubts if this was a favorable case for extraperitoneal section.

The reviewer has several times performed abdominal Cesarean section for a dead child in transverse position with the uterus so tightly contracted as to threaten rupture. Some of these cases were undoubtedly infected upon admission. The delivery of the child was most readily accomplished by the usual intraperitoneal section and in the interest of the mother, as the cases were undoubtedly infected, the operation was terminated by the Porro method, amputating the body of the uterus, and leaving the stump fixed in the lower end of the abdominal incision. The results were very satisfactory. It is hard to imagine a more difficult, hazardous, and futile proceeding than the extraperitoneal section where it is necessary to deliver the child by version after the section.

CESAREAN SECTION FOR PLACENTA PREVIA. Essen-Möller¹ reports the cases of two primiparæ, having placenta previa, delivered by Cesarean section. The patients were aged seventeen and thirty-one years, and were admitted to the hospital after serious hemorrhage, but with the cervical canal undilated. In both there was central placenta previa. Both patients made uninterrupted recoveries and rapidly made good the lost blood. One of the children survived, the other was stillborn. The writer believes that, in the average case, section is not indicated, but that where there is no dilatation, if hospital facilities can be procured, it is the operation of choice.

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

A THIRD CESAREAN SECTION UPON THE SAME PATIENT. Meyer¹ reports the case of a patient having a generally contracted and flattened pelvis, upon whom, in 1908, he had performed an extraperitoneal section successfully, and a second time had operated upon the same patient with the usual transverse fundal incision.

The third pregnancy terminated somewhat sooner than was expected, but although pituitrin was given to stimulate uterine contractions, the head did not enter the pelvis. Upon section, there were found adhesions in the old scar. After the uterus had been emptied and turned out of the abdomen, it was observed that in the vicinity of the incision in the uterine wall the tissues were extraordinarily thin. The operation resulted successfully.

EXTRAPERITONEAL SECTION. Eisenreich² reports, from the Munich clinic, 145 cases of extraperitoneal Cesarean section. Of these, 137 were entirely extraperitoneal, while 8 were transperitoneal during the operation. In 4 there was a very deep attachment to the peritoneal sac. In 3 there were very greatly enlarged veins, and in 1 the anterior uterine wall was in relation with a placenta previa.

Of the 137 extraperitoneal, the peritoneum was torn to a slight extent in 44, but the tear was so small that it was readily repaired by suture. In 4 cases, after the wound in the uterus had been closed at its upper angle, the Fallopian tubes were ligated. Of the 137 cases operated upon by the extraperitoneal method, 9 women died, 4 from eclampsia, 3 from septic infection, 1 from sudden dilatation of the heart three hours after the operation, and 1 six hours after the operation from atonic secondary hemorrhage. The maternal mortality was 3.7 per cent.

Of the 137 children, 126 lived. Of the 11 fatal cases among children, 2 were prematurely born from eclamptic mothers, and 1 prematurely born from a case of inoperable carcinoma of the cervix. The fourth child was in transverse position and was born with a beating heart but could not be revived. Of the remaining 7 children that died 5 died at or immediately after birth from the long duration of the operation. One child died between the second and third day after its birth, and autopsy did not reveal the cause of death.

In 22 cases the extraperitoneal section had been followed subsequently by pregnancy, and of these, section was repeated in 18. Of these 18, the second section was readily performed by the extraperitoneal method in 7. In 1 case after the extraperitoneal section the operator proceeded to sterilize the patient and opened the peritoneum. In the other cases there were found very strong adhesions in some of the previous scars, with the development of large vessels which obliged the

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 6.

² Zentralbl. f. Gynäk., 1915, No. 30.

operator to perform a transperitoneal operation. Of the women in whom the operation terminated by intraperitoneal section, 2 died of peritonitis. The children lived.

There were 35 cases in which the membranes had ruptured a long time before the operation, and these were examined bacteriologically. In 15 the uterus was evidently infected, and in 9 of these streptococci and staphylococci could be recognized.

VAGINAL CESAREAN SECTION. Bar¹ contributes a very well-illustrated paper upon this subject. He credits the operation to Düerssen, in 1896. He states that it has not found great favor with French obstetricians, except in rare cases, and that there it is often successful. When therapeutic abortion would be indicated, it gives the operator a prompt and accurate method of emptying the uterus. It is also useful in pernicious nausea and vomiting in pregnancy, complicated by diseases of the heart, and when the condition of the woman demands prompt intervention. There can be no doubt but that the operation is less dangerous than violent dilatation of the cervix, for example, with Bossi's dilator, which lacerates the cervix so severely. In the case of primiparæ, in which the cervix is not easily dilatable, it is preferable to Hagar's dilators in the treatment of abortion.

When the child is not too large, it may be useful, as in the case of eclampsia where speedy delivery is selected. As a rule, it is best not to perform the operation after the pregnancy has gone eight or eight and a half months. Bar does not think it suited for cases of placenta previa. He states that the operation may be done under general or local anesthesia, and that if the former is selected, he prefers chloroform. If local anesthesia should be tried, Schleich's mixture may be used or an injection of pantopan, hydrochlorate of morphin or scopolamin-morphin. If general anesthesia is contraindicated, local anesthesia after Letra's method may be found very useful. Cases are most successful which are performed at about the fifth month of pregnancy. In the Tarnier Clinic, the following mixture is used for local anesthesia: novocain, 0.5; solution of adrenalin 1 to 1000, 25 drops; salt solution, 1000 grams. This is given just before the operation. Reclus's syringe holding 2 c.c. is used for this purpose. An injection of 8 to 10 cm. is also made at the vulva near the posterior wall of the vagina. The cervix is then seized with tenaculum forceps, and drawn down and incised at the junction of the vaginal mucous membrane with the cervical tissue. Should the patient give evidence of feeling pain, several injections of the anesthetic solution may be made in the tissues about the cervix. Usually in from eight to ten minutes the local anesthesia is complete.

After the anterior incision, the tissues are pushed up with gloved

¹ Archives Mensuelles d'Obstétrique, January, 1915.

fingers until the bladder is thoroughly pushed up and a large retractor is inserted. The cervix is then strongly raised, and with blunt-pointed scissors, the posterior wall is incised at the vaginal junction. The anterior lip of the cervix is split in the median line up to the lower uterine segment, when the posterior lip is also divided. The membranes then appear. They are ruptured and the child extracted, the two lips of the cervix separately stitched, the vaginal tissue united to the cervix, and on the anterior aspect, a small drainage-tube is left leading up toward the base of the bladder.

The hemorrhage during the operation is very little, especially after the use of novocain-adrenalin. There is decided risk of injuring the bladder, as various operators have reported 11, 9, and 7 such injuries in 257, 267, and 76 cases respectively.

Bar's method of incising the posterior lip of the cervix follows the original recommendation of Düerssen. This has been abandoned by the majority of American operators who find it necessary to incise the anterior lip of the cervix only. In multiparous women, with relaxed tissues, if the operation is restricted, as Bar advises, to the early months of pregnancy, it may proceed smoothly. The after-effects of the operation are sometimes far from satisfactory. In the reviewer's experience, union is not always perfect in the incised tissues and the patient was left with ununited surfaces, which can be with difficulty subsequently repaired. It has been found difficult to control these patients, for they frequently suffer little pain or disability after the operation, are not willing to remain quiet sufficiently long to secure good union, and will insist sometimes on leaving the hospital before they are fit to do so.

In a case seen recently by the reviewer, the patient had been operated upon by vaginal Cesarean section during her first pregnancy, and near its end for an eclamptic convulsion. The tissues had been considerably lacerated in delivery, the union had been unsatisfactory and some time after a second operator had repaired the first lesions. He found a fistula passing up the anterior lip of the cervix through the region at or behind the neck of the bladder. This he was unable to close, and when the reviewer was called to see the patient, this fistulous track was still present. The patient seemed ignorant of its existence, but it was an avenue through which infection might travel to the tissues about the bladder.

Vaginal Cesarean section in the experience of good operators is now very strictly limited to the early months of gestation only. It is undertaken in those women who have dilated and easily dilatable birth canals, and where the operator is reasonably certain that no pathological condition exists within the pelvis or abdomen. In all except this narrow line of cases, abdominal section is greatly to be preferred.

CESAREAN SECTION, ITS WIDE APPLICATION. Parke¹ reports 9 cases for the following indications: His first was a woman who, during her first labor in a difficult forceps delivery, had rupture of the symphysis with a separation of about 1 inch. The child was injured in birth and did not recover for two months, and the mother suffered greatly. After her convalescence she could walk with great difficulty and had continued pain in the symphysis and back with incontinence of urine. The patient requested section to terminate the second pregnancy in view of her experience in her first labor. The operation proceeded smoothly, and the mother and child made a good recovery.

The second patient was a woman suffering from nephritis, with edema and cough. She was a primipara and the child was in breech presentation. Owing to the cough, chloroform was employed as an anesthetic. After the uterus was emptied, it was found there was a marked projection of the sacral promontory, so that a living child could not have been born in breech presentation. The mother and child made a good recovery.

The third case was done for eclampsia in a primipara with a hard, undilated cervix. The head was freely movable above the pelvic brim, and there were no heart sounds. The patient made a good recovery; the child was dead at the time of operation. The reason for selecting section was the fact that the cervix was so hard and undilated that it would have been more difficult and dangerous to have delivered the patient through the vagina.

Cesarean section also was done upon a primipara, aged nineteen years, pregnant eight and a half months, brought to the hospital with eclampsia. The child was living and the cervix undilated. Both mother and child recovered, although the mother had some fever during convalescence.

Section was also performed upon a woman for nephritis, cardiac dilatation, and edema of the lungs. The patient was eight months pregnant, and for three months had been very short of breath, with cough and expectoration. She grew suddenly very much worse, and was immediately delivered by section under local anesthesia by Schleich's solution. Although the child's cord pulsated at birth, it could not be made to breathe, and serum escaped freely from the mouth and nose. Thirty-six hours after delivery the mother died from nephritis.

The sixth patient had placenta previa. A multipara, the cervix completely occupied by placenta, and the fetal head not engaged. The fetal heart sounds could not be distinctly made out, although it seemed probable that they were feebly heard. Nitrous oxide was given for the skin incision and for inserting the skin sutures, the operation otherwise being conducted without an anesthetic as the patient's condi-

¹ American Journal of Obstetrics, August, 1915.

tion was critical owing to her previous severe hemorrhage. The baby could not be made to breathe, but the mother recovered.

Cesarean section was performed on a woman who had had a forceps delivery, a gastro-enterostomy for ulcer and a Cesarean section with a living child. During her second pregnancy she had numerous fainting spells and cardiac palpitation. Cesarean section delivered a living baby with a large hydrocephalic head, double hare-lip and cleft palate. It lived but a few moments. The patient's stitches became infected, and she had hernia after operation. Her third pregnancy was terminated by section, the child being poorly developed and living but an hour. A supravaginal hysterectomy was performed and the hernia sacs were excised. The patient made a good recovery.

Cesarean section was also indicated in the eighth case. Because vaginal examination had been made in the patient's home and in the hospital, the extraperitoneal method was employed. The mother and child did well, but the wound became infected late in convalescence.

A multipara in her third pregnancy was the ninth patient. She had lost two children in efforts to give birth through the vagina, and the classic section was successful.

This series of cases illustrate fairly the range of indications for which section is now performed.

EXTRAPERITONEAL CESAREAN SECTION. Schäfer,¹ in three and a half years, has done 130 Cesarean operations. His method consists in a long incision between the umbilicus and the symphysis. The uterus is then incised in its lower portion without disturbing the bladder. No mention is made as to the passing of the incision through the cervix or through the lower segment. The head of the child is delivered with forceps through the smallest possible incision. This is not always easy, but so far in his experience, the children have not suffered from this method of delivery. A small abdominal speculum is then inserted in the upper angle of the wound, so that the uterus is pressed against the abdominal wall to prevent the blood and amniotic liquid from the uterus from gaining access to the abdomen, and so that the intestines shall be kept from prolapsing into the wound. The placenta is then expressed, and the incision in the uterus closed by two layers of continuous catgut. The peritoneum is then closed by continuous sutures.

There have been 2 cases of spontaneous rupture of the scar in subsequent labor among these patients. The second occurred after pains had lasted but a short time, and without distending the scar in the lower uterine segment. The decidua had grown into the muscle of the uterus, and the scar was essentially a connective-tissue scar. In both cases when the child was extracted, the incision had torn somewhat toward one side and posteriorly. Whenever the incision tears during

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, No. 23.

the extraction of the child, suturing is made much more difficult. At the first incision, the body of the uterus pressing against the abdominal wall keeps back the intestines efficiently. The operation is performed with the patient in the horizontal position to bring the uterus as firmly against the abdominal wall as possible.

The indications for operation were, in 5 cases, cysts which had become wedged into the pelvis; in 1, dystocia due to previous ventral fixation; in 1, fracture of the upper portion of the thigh which had not knit; in 1, a primipara, aged forty-two years, breech presentation without dilatation of the cervix or engagement; 1 patient had nephritis and a severe heart lesion; 2 primiparæ had placenta previa; in 119 patients the pelvis was contracted. There were 16 cases of repeated section, and 2 patients had previously had hebosteotomy. The smallest true conjugate in 13 cases varied from 4.5 to 6.5 cm.; in 39 patients the true conjugate was 8 cm.; in 7 it was 9 cm. In one patient the true conjugate was 9.5 cm., the cervix was slightly dilated and a loop of umbilical cord had prolapsed. The head of the child was unusually large, and had not entered the pelvis. The child weighed 4850 grams.

While it may be logical in some cases to have the patient make the trial of labor, delay exposes her to greater danger from infection. It should be the problem of the obstetrician to forecast, as far as possible, what nature can do and thus anticipate disaster. There was 1 case of transverse presentation and 1 of breech presentation; all the others were presentations of the head.

Fifty-three of these patients had been in labor longer than twenty hours; 39 from twenty to fifty hours; 14 from fifty to one hundred and fifteen hours before operation.

In 64 cases the membranes ruptured during the operation, that is, in about one-half the cases. In 36 patients they had ruptured in from one to twenty hours before operation; in 10, from thirty to seventy-two hours before operation. None of these mothers died. All were examined before the operation, some of them several times. More than one-half had been a long time in labor with ruptured membranes, and had a temperature ranging from 101° to 102° F. Of the 130, 3 mothers died. Twelve women had abscess in the abdominal wall; 8 some unimportant complication in the healing of the abdominal wound; 1 had thrombosis; 1 had abdominal fecal fistula which healed in fourteen days.

The 3 fatal cases were as follows: One was in her sixth labor, attempted forceps delivery having been made before the patient was admitted to the hospital. This attempt produced bleeding, for which a vaginal tampon was employed. The true conjugate was 8 cm. On admission it was noticed that there was a peculiar crackling sound on palpating the lower portion of the abdominal wall. The temperature was about 101° F., pulse 110. The abdomen was somewhat distended.

The uterus was not ruptured but the patient died on the tenth day from septic peritonitis. The writer believes that a Porro operation would have been much better. He is convinced that extraperitoneal section will not always save a septic patient.

The second fatality occurred in a multipara whose true conjugate was 8 cm., and who had been five and a half hours in labor. The operation proceeded very smoothly, with no special hemorrhage. The membranes ruptured during operation. Eight hours afterward the patient died in collapse, although there had been no postpartum bleeding. Autopsy revealed no cause for death unless it might have been a congenital defect in the wall of one of the ventricles.

The third fatal case was that of a primipara, aged thirty-five years, delivered under local anesthesia by the classic section. The indication for operation was a severe collapse from nephritis and heart lesion. The patient was discharged apparently convalescent from the operation on the tenth day. On the forty-seventh day after the operation, after she had been five weeks at home, she was brought back again suffering from peritonitis, and operated upon, dying the following day. The cause of sepsis was found to have been pyosalpinx which had probably developed from septic endometritis at the time of delivery.

All the children were born living but 3 perished afterward. In the first case the mother had contracted pelvis, nephritis, and heart lesion. The child was asphyxiated and died within two days. The second child weighed only 1800 grams and died during the first week from inanition. The third child was born of a mother whose true conjugate was 8 cm. The child weighed 3550 grams and was deeply asphyxiated and could not be revived. The fetal mortality in the series was 2.3 per cent.

One hundred and nine of the mothers left the hospital in good condition from the ninth to the twenty-first day; 22 left the hospital from the twenty-second to the sixty-eighth day, and in these cases there was some complication in the puerperal state.

The women were treated by a resection of a portion of the Fallopian tube to prevent further conception. This was done only in those cases in which there was already a living child, or where the patient was delivered of a child at the time of abdominal section. The physician should be careful not to stake the future of a family upon the life of one child only. Sterilization should not be considered until after a second section or until the mother has had two living children.

The writer believes that the best results are obtained by the most simple methods and not by the complicated extraperitoneal section. In cases of moderate contraction of the pelvis, where observation of the patient shows that spontaneous labor fails, delivery by section will give the best results. The writer's experience with extraperitoneal section does not lead him to accept it as the ideal operation.

In discussion, Strassmann stated that in doing Cesarean section he places the patient in a half-sitting posture. This brings the uterus forward against the abdominal wall. Lumbar anesthesia is useful, and he believes, minimizes the strain of pressing and forcing the amniotic liquid or air into the abdomen. In cases in which the mother had a severe heart lesion this posture with lumbar anesthesia had been especially useful. He has ceased to employ the obstetric forceps, but seizes whatever part of the child presents and pulls the child out. He has done three sections for placenta previa at full-term pregnancy where there was a great desire for a living child. Two of the patients were old primiparæ. Sterilization he limits as much as possible, and under no circumstance would perform it at the first or even at the second section. The circumstances justifying sterilization must be fully developed, and a clear understanding be had with both parents.

He believes that for the fetus, in a case of contracted pelvis, the prognosis depends more upon the time when the membranes rupture than upon the size of the pelvis. The question whether version is made at once or sometime after the membranes rupture is of great importance in the prognosis for the child and is of far more value in making the prognosis than 1 or 2 cm. in a pelvic diameter.

Strassmann is still a believer in prophylactic version and regrets that it is so little employed at the present time. He admits that Cesarean section gives the child a much better chance. He believes, however, that one is justified in performing section upon a primipara over forty years of age, who has been long in labor without progress, the head having failed to engage, even though the pelvis may be normal. Section is indicated not only to shorten labor and protect the mother against severe infection, but also to save the life of the child. Since 1902, he has done 17 sections with the death of only 1 mother. In this case an effort has been made before the patient was brought to the hospital to deliver her by forceps. Autopsy showed septic endometritis. In his cases of section all the children were born living and did well.

Bumm¹ reports 116 cases of section, in all of which he endeavored to make the operation an extraperitoneal one. He was not, however, always successful. The anatomical relations of the peritoneum between the bladder and uterus are such, and vary sufficiently, that the peritoneum must often be opened in this operation. In 78 of the 116 cases he did not open the peritoneum. In 22 it was opened unintentionally, and in 16 purposely because he failed to find the anatomical conditions favorable for operation otherwise.

Six of these mothers died, 2 in eclamptic coma and 4 from peritonitis. Of the 78 in whom the operation was entirely extraperitoneal there was no death. These patients had a puerperal period free from fever for

¹ *Ztschr. f. Geburtsh. u. Gynäk.*, 1915, No. 23.

ten days, then peritonitis set in with death on the twenty-second day. Autopsy showed endometritis and purulent salpingitis, showing that the infection had traveled up along the mucous membrane.

Of the 38 cases in whom the peritoneum was opened 1 had prolapse of the umbilical cord and fever; another had fever for which operation was at once undertaken during labor, and a third had prolapse of the umbilical cord and had been long in labor and greatly desirous of a living child. In these cases the operation could not be done by the extraperitoneal method. If virulent bacteria are present at the time of operation, the choice of a method makes no difference whatever.

Bumm thinks that better results are obtained after the extraperitoneal than following other methods. In 46 of the 116 cases the membranes had ruptured longer than twelve hours before operation, and the patients had a distinct rise of temperature. In his last fatal case, infection of the scar was the beginning of the peritonitis. If this patient had been operated upon by the extraperitoneal method, this would not have happened.

In aseptic cases he would perform classic section; in septic cases he would make the wound extraperitoneal. He believes, however, that outside the hospital the extraperitoneal operation should not be undertaken. Septic cases should not be treated by section. It is in the hospital that the extraperitoneal method has its place. He makes his incision as small as possible, extracting the child by the forceps. He takes care not to introduce the entire arm into the uterus because the peritoneum may be easily torn.

CESAREAN SECTION FOLLOWING PRIMARY SECTION WITH BILATERAL OÖPHORECTOMY. In the *American Journal of Obstetrics*, December, 1915, Broadhead reports the case of a patient on whom he did Cesarean section followed by the removal of both large multilocular cystic ovaries. The patient made an uneventful recovery and was informed that while subsequent pregnancy was possible there was only the remotest chance of conception. Menstruation, however, returned and conception followed. A second section was performed followed by sterilization of the patient at her earnest request and that of her husband. During the operation, at the former site of an ovary, a corpus luteum of pregnancy was found but there was no other evidence of ovarian tissue. The case illustrates how difficult it is to be sure that all the ovarian tissue has been removed if the ovary is not in any way abnormal in size, shape, or location.

RUPTURE OF A PREGNANT UTERUS THROUGH AN OLD CESAREAN SECTION SCAR. Walls¹ exhibited, before the North of England Obstetrical and Gynecological Society, a ruptured uterus removed from a patient, aged thirty years, who had had three previous Cesarean sections. In

¹ British Medical Journal, February 13, 1915.

the present instance she was seven months pregnant when sudden severe pains commenced followed by collapse. The abdomen was opened and the peritoneal cavity found full of fluid which was oozing from the top of the old section scar in the uterus. Supravaginal hysterectomy was performed but the patient died from shock.

The second specimen was obtained from a patient who had accidental hemorrhage. She had previously been operated upon by Cesarean section and was within ten days of full term, in her second gestation, when symptoms of accidental hemorrhage appeared. Operation was at once performed, and the abdominal cavity found to contain a large quantity of blood oozing from the lower part of the old Cesarean section scar. This was very broad and thin, and was about to rupture in its entire length. Supravaginal hysterectomy was done and the patient made a good recovery.

Shaw showed a specimen of spontaneous rupture of an old Cesarean section scar in a full-term pregnant uterus.

The patient had had a previous section and was within a week of full term in her second pregnancy, for which section was to be performed, when she was taken during the night and while in bed with abdominal pain. Six hours later she walked to the hospital, arriving in a collapsed condition, complaining of pain in the middle line of the abdomen from the umbilicus to the pubes. The abdomen was very tender in the middle line. The pulse was rapid and irregular and the temperature subnormal. Upon opening the abdomen, the old Cesarean scar was found to have completely opened up so that the child was delivered without any enlargement of this wound. A placenta was on the anterior surface of the uterus and virtually closed the wound. At the time of operation no further bleeding was taking place, and the lower part of the abdominal cavity was filled with clotted blood.

Lumbar Anesthesia. Gfroerer¹ gives the results of lumbar anesthesia in the Würzburg Clinic. He reports a series of 500 anesthetics. Two cubic centimeters of a 5 per cent. tropacocain solution were injected after 2 c.c. cerebrospinal fluid had been allowed to escape. Before operation the patient was given from 6 to 8 c.c. of a solution containing 0.01 morphin and 0.0004 scopolamin. The technic of the method was varied somewhat in proportion to the development of the patient. The method was successful during the entire operation and this averaged at least forty-five minutes in 89.54 per cent., and but partially successful in 4.9 per cent. Nausea and disturbances were observed in 7.8 per cent. of all the patients. In 4 cases collapse developed and the method seemed to be in some degree responsible for it. Severe headache was observed in 1.14 per cent.; vomiting after operation in 0.8; twice in from the thirteenth to the tenth day there was paralysis of the abducens

¹ Monatsschr. f. Geburtsh. u. Gynäk., 1915, Band xli, Heft 1.

nerve, and in 1 case in thirty minutes after the operation the patient developed a psychosis. In general, however, his results were very satisfactory.

Obstetric Analgesia by Tochonalgine. Tissier¹ writes in condemnation of tochonalgine and antalgine. He cites the remedy of the chevalier, Ramognino, who flooded Paris with photographs and placards claiming the virtues of his lotion, which, when rubbed upon the body of the parturient woman, made parturition painless. While this delusion was practised a long time ago, he believes it to be no worse than the recently introduced tochonalgine and antalgine. The formula of tochonalgine is kept secret, but the important element in the preparation is morphin. This is supposed to be in a watery solution but there is no way of telling the exact amount present. It is supposed to have been acted upon by ferments in such a manner as to deprive it of its toxic properties and leave its power of subduing pain. If the injection of the contents of 1 ampoule was not sufficient, one could without fear give as much as three times, to three and a half times, the original dose.

It may be remembered that Ribomont read a paper before the Paris Academy of Medicine enthusiastically recommending this substance. In this it was stated that a chemist had produced this remarkable preparation by acting upon morphin with living ferments. Various names were given by those purporting to have studied the preparation to the different ingredients in it. It was difficult to find the exact amount of the active principle of the preparation, but this was estimated to be 2.47 to 2.60 per 100. It was found by Guinochet that 4 ampoules varied greatly in the amount of morphin which they contained. One had 1.57 per 100; the second, 1.95 per 100; the third, 2.50 per 100; and the fourth, 2.97 per 100, of hydrochlorate of morphin.

The sensibility of infants to opium is well known, and varies greatly. Cases have been seen in which, when the mother received this substance, the child was born apparently dead and was resuscitated with the greatest difficulty, its respirations having been exceedingly slow and feeble. In the Maternity Department in the Hospital Rothschild, Schwab observed a number of cases of severe asphyxia in the infant.

The writer employed the substance twice; 3 ampoules in the first case, and 2 in the second. The results gave him great anxiety. In 1 case two injections were made during labor, and although the labor was spontaneous, the child at birth breathed very badly, never cried, and succumbed in thirty-six hours. The writer believes that there is no question but that the drug caused the death of the infant.

Induction of Labor in Normal Pelves at Term. Reed,² in a paper read before the Chicago Gynecological Society, states that he has sought

¹ Archives Mensuelles d'Obstétrique et de Gynecologie, July, 1915.

² Surgery, Gynecology and Obstetrics, March, 1916.

to simplify or regulate the course of labor along the line of a high surgical conservatism. His primary question is, "Can we assure ourselves that the child is mature, and given a mature child, shall we determine the onset of labor?" The writer believes that we can and should do these things, and presents some preliminary observations for consideration and record. To estimate the child's maturity he takes an average of 50 cm. long and a weight of from 5 to 8 pounds.

In addition to the routine measurements of the pelvis, he obtains his estimate of the size of the child by length according to Ahlfeld's rule, and then by Müller's method of crowding the head into the pelvis. In his cases the length of the child rarely varied more than 2 cm. from the actual postpartum findings, and usually was as close as 1 cm. and less. The variation was safely below rather than above the actual figures.

By Ahlfeld's rule in vertex cases, the measurements are made with the pelvimeter from the upper border of the symphysis to the breech of the child, the result is doubled, and 2 cm. subtracted for the thickness of the abdominal wall. The result is the length of the child. These figures are corrected by the history of the case, the last menstruation and the day of quickening, accepting seventeen weeks from conception as the approximate day of quickening and counting twenty-two weeks from this, it gives the termination of pregnancy. The writer admits that the calculation is not absolute and so allows a week or more in some cases, depending upon the parity of the mother and her degree of intelligence. If the history and the anatomical findings are harmonious, a day for labor is definitely appointed.

Then comes the induction of labor. This is done by introducing, under a strict asepsis, a Voorhees bag without rupturing the membranes. If pains do not start within an hour or if compression is desired, as in placenta previa, or a more rapid dilatation, a weight of 1 or 2 pounds is attached by a tape to the protruding tube of the distended bag and passed over the foot of the bed. Usually, in from five minutes to one-half hour, contractions begin and labor has been inaugurated just as one would start the pendulum of a clock. In three hours and twenty minutes on an average the bag is expelled by strong pains, dilatation is complete, the head comes down, the membranes rupture, and the second stage begins. If pains are weak and shallow pituitrin may be indicated. If strong and regular morphin and scopolamin or gas or chloroform.

The writer admits that he greatly feared septic infection. He made smears from the vagina and cervix of all cases, and naturally found every variety of pathogenic organism, but proceeded to introduce the bag nevertheless, and none of these women had a rise in temperature postpartum. He accounts for this by the fact that the shortening of the labor process and the preservation of the maternal vitality maintains

the maternal immunity, and prevents infection that would easily and probably follow a more prolonged labor whether induced or uninduced.

The second danger is the possibility of prematurity. This happened in one instance. The case was not supervised and an unreliable resident physician made the measurements. In attempting this he measured the uterus instead of the fetus and the result was a seven months' child. This danger is practically *nil* when the proper care is used. In 2 or 3 cases the bag changed the position of the presenting part but not unfavorably.

The results in 100 consecutive cases were primiparæ 35, multiparæ 65; average duration of labor from an hour and forty-five minutes. The shortest labor was fifty-five minutes and the longest thirty hours; twenty-eight hours in a multipara, with much scar tissue in the cervix.

The bag broke six times and was reinserted three times. The average time for the expulsion of the bag was three hours and twenty minutes. Twice, introduction of the bag ruptured the membranes. There were two maternal deaths; one from placenta previa with myocarditis, and the other from pneumonia eight days after labor. Neither death can be charged to the bag. The average weight of the children was 7 pounds 7 ounces; the smallest 5 pounds, and the heaviest 10 pounds 5 ounces. Seven babies died.

There were 3 cases of version and extraction for placenta previa, transverse presentation and prolapse of the cord; 17 cases of laceration of the perineum of 2 degrees or less and episiotomy; 1 case had severe albuminuria; forceps were used in 23 cases, and 7 patients had postpartum hemorrhage.

This series of cases has a high fetal mortality and a considerable maternal mortality and morbidity. The reviewer believes that no more dangerous practice can be advocated than the induction of labor without a definite and positive indication in the interest of the mother or of the child, or of both. Nature's periods are not measured by time-pieces and so long as the physiology of mother and child is practically normal, interruption is certainly unjustifiable.

Extraperitoneal Section after Latzko's Method. Pánek¹ has performed 18 sections by Latzko's method. The indication for the operation was contracted pelvis. Eight of the patients were primipara and 10 multipara, on whom other operations had already been performed. In accordance with the method employed, incision was made in the median line, and while the urinary bladder was considerably distended. The placenta usually came away spontaneously, but occasionally was very easily expressed. A strip of gauze was inserted in the lower angle of the incision in the cervix. Seventeen of the children were born living, of whom 1 died three hours later. The last child so delivered breathed

¹ Zentralbl. f. Gynäk., 1915, No. 25.

but a few times. The loss of these two children should be attributed, the author thinks, to the fact that the operator waited too long for dilatation of the lower uterine segment.

Of the mothers, 9 had primary union and were discharged from the hospital in fifteen days on an average. Eight had secondary union, of whom 6 had been repeatedly examined before entering the hospital, or had fever upon admission. The last case admitted with fever passed through a severe septic infection, but left the hospital in good condition on the fiftieth day after the operation. There was no mortality among the mothers.

This method is especially useful in suspicious and infected cases, but owing to the difficult technic of the operation its performance must be limited to hospitals. It encroaches most upon the field of hebotomy which has a high morbidity for the mother and a bad prognosis for the children. It is only in clean cases that the classic section comes into competition with the operation under discussion.

The Return of Menstruation after Operation. Abeler¹ has investigated the time at which menstruation usually returns after the performance of operations upon the genital organs. He finds, with reference to disturbed menstruation after operations upon the ovaries, that when the first period after the operation comes either earlier or later than the average time, the next period following, in the greater percentage of cases, may be deferred about four weeks, while occasionally menstruation may return in a few days and rarely may be deferred for a very considerable time. There seems to be no way of forecasting what will happen in these cases. As a rule, the third period becomes normal.

As regards disturbances of menstruation after various operations, Lindenthal advances the theory that there is an alternating function in both ovaries, and that ovulation occurs at each period while the rupture of a Graaffian follicle occurs each month.

After the removal of the Fallopian tubes, menstruation ceases if the Fallopian tube removed contains a ripe follicle. The ovary left behind assumes a vicarious function for that which was removed. It is also observed that after the removal of ovarian tumors, a long period of amenorrhea may follow the operation, and this is not explained by Lindenthal's theory. In these cases there seem to be other factors as important and influential. Among them is the shock of operation, to which great importance is ascribed by Bondi. Analogous to this are those cases in which, after some surgical procedure upon other portions of the body than the genital tract, menstruation is very much delayed. There seems to be some relation between the length of time in which menstruation is disturbed and the gravity of the preceding operation. In other cases the nervous peculiarities of the individual

¹ Zentralbl. f. Gynäk., 1915, No. 9.

undoubtedly gave a great influence. After the ligation of the uterine veins, when the tubes and ovaries are removed, and after severe uterine hemorrhage, menstruation is often greatly delayed.

The Forceps in the Nineteenth Century. Arluck and Girsdanski¹ publish the statistics of forceps operations, based on 6000 confinements at the Jewish Maternity Hospital, New York. The introduction of pituitrin, in 1909, has greatly lessened the number of forceps operations. This powerful drug, however, can only be used with safety when the cervix is dilated or dilatable, and the presenting part well engaged in the bony pelvis, and the fetal heart sounds audible. It is most useful in dystocia due to dry labor, and also to delay occasioned by posterior rotation of the occiput when the maternal pelvis is normal. The percentage of forceps cases was 5.3, or 334 out of 6083 labors, a low rate. The high application of the forceps has been practically eliminated, greatly decreasing the infant mortality. Cesarean section and pubiotomy have given good results, constantly improving. There were 63 Cesarean sections with a maternal mortality of 6.3 per cent., and 15 pubiotomies (mortality 6.6 per cent.).

The so-called twilight sleep was introduced into the hospital in 1914, followed by a marked increase in the use of forceps. In cases seen early, induction of labor was carried out with good results. Krause's method, namely, the passage of a bougie or large rectal catheter between the posterior wall of the uterus and the membranes unruptured, was the method usually practised. Hospital patients, however, are not careful about reporting, and therefore statistics from such hospitals are often not entirely satisfactory.

The Influence of Manipulations Within the Uterus during Labor upon the Morbidity of Parturient Women. Groot² believes that the results of practice in the maternity hospital of Utrecht show without doubt that, as a general rule, obstetricians are inclined to exaggerate the potency for sepsis, of the secretions and bacteria found in the vagina during pregnancy. In all the operations performed through the vagina, microbes were transported in large quantities from the vagina into the uterine cavity without, in any case, producing fatal infection. There were 84 cases of induced labor; 56 of manual delivery in the clinic; 98 of manual delivery in the polyclinic service; 38 cases of tamponing after delivery in the hospital, and 79 cases of tamponing after delivery in the service of the polyclinic. This makes a total of 355 cases without fatal infection. There was, of course, in these cases delivered by some manipulation, a greater morbidity than after normal labors, but it could not always be proved that the operation was responsible for this. In most of the difficult cases the obstetric

¹ New York Medical Journal, May 22, 1915.

² Archives Mensuelles d'Obstétrique, June, 1915.

conditions present were very complicated. There seems a question regarding the practical value of rubber gloves. It is certainly possible for obstetric purposes to render the hands antiseptic and to conduct labor safely without rubber gloves. Whatever may be the nature of the microbes found in the vagina the writer is convinced that it is only in the rarest instances that these germs, introduced into the uterus, cause fatal infection. One would not assert that microbes found in the vagina and passing into the uterus *could* not give rise to fatal septic infection. On the contrary one must accept autogenous infection as not being an excessively rare occurrence.

In the service of the polyclinic and in the hospital the writer has observed a very considerable number of cases of autogenous infection which could be demonstrated. The condition of the secretions in the vagina has much to do with the virulence of its bacterial content. The familiar expedient of tamponing the uterus with iodoform gauze to prevent hemorrhage, if carelessly done, may be followed by infection, but in the Utrecht wards this had not been observed in a single case. On the whole, this procedure is so valuable that, under proper precautions, it may warmly be recommended.

The Relation of Gynecological Operations to Bad Obstetrics. Reynolds¹ draws attention to the improvement in the practice of obstetrics which now deals properly with lacerations and restores the patient, after her child-bearing days are over, to sound and comfortable health. He finds, however, that the exhaustion of comparatively unrelieved labor, minor septic infection and mechanical injuries resulting from labor, still leave women in a greater or lesser degree of ill health. It is sometimes difficult to appreciate, in neurasthenic cases, to what extent their symptoms may be attributed to neglected pregnancies and labors. The greater the exhaustion during labor, the less complete will be the recovery from injuries and return to normal conditions.

Attention is also called to infective lesions of obstetric origin which, while they may not be severe enough to endanger life or cause serious illness, leave the patient in a condition of chronic invalidism. The chronic salpingitis, which were formerly inaccurately thought to result from gonorrhea, is often caused by infection accompanying parturition. In order to remedy these conditions, obstetric cases must be conducted as carefully as surgical operations, in specially prepared rooms and by trained obstetricians with a sufficient number of competent assistants. This is very rarely possible.

As regards lacerations in skilful hands, primary repair yields, in the great majority of cases, results which are valuable because they postpone trouble for many years. Repeated subsequent labors may, however, cause undue dilatation and result in prolapse. Every woman

¹ American Journal of Obstetrics, March, 1915.

who has been torn should be examined after the lapse of some months from her delivery and may then be informed as to her actual condition. Displacements of the uterus of puerperal origin are practically always complicated by subinvolution, and this is frequently the result of a lack of complete asepsis during confinement. This is frequently the result, in addition to a mild infection, of getting up too soon.

There is sometimes an opportunity to permanently relieve displacements without operation, if active treatment is begun immediately after the termination of a subsequent pregnancy. While thirty years ago the death rate in obstetrics was enormous, today it is low, but, unfortunately, the morbidity rate remains considerable.

Teaching Obstetrics. Chipman¹ emphasizes to the necessity for a thorough education in obstetrics. The requisites of good teaching are accordingly three: The student, the teacher, and the patient, on whose immediate behalf he teaches. The last has been greatly neglected in the early teaching of obstetrics in this country. The writer draws attention to the rapid increase in the clinical teaching of obstetrics.

The Need of Hospitals for Maternity Service. Davis² draws attention to the very serious lack of private rooms of moderate price for obstetric cases. Statistics abundantly show that death and disease in mother and child may be materially lessened by proper hospital accommodations and service. That skilled service is frequently required, he illustrates by the experience of a year in a small maternity department in a large city hospital, to which are brought by ambulance at all hours of day and night, not only normal cases but those which have been badly treated by midwives and physicians, and those which have developed especial difficulties. Of all the patients admitted, 25 per cent. required surgical assistance. Among the operations, three-fifths were distinctly major or important surgical procedures. Among these there was no death from puerperal septic infection, and among the major surgical cases there was no death from any cause. No child, in good condition when the mother was admitted, died. The entire mortality among all mothers in emergency and other cases was 0.5 of 1 per cent.

THE NEWBORN.

The Care of the Umbilicus. Müller³ reports the experience of von Herff's Clinic in Basel in the care of the umbilicus in the newborn.

He believes that the usage of the clinic is based upon correct grounds of reasoning. If the results had not been perfectly ideal, the fault is largely in the carrying out of the methods. It must always be remembered that infants vary greatly in their power of resistance to

¹ American Journal of Obstetrics, March, 1915.

² Ibid.

³ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvii, Heft 3.

organisms and in their general health. In some, the umbilicus heals more quickly and soundly than in others, and so one sees, often ten days from birth, cases in which the condition of the umbilicus is far from satisfactory. It is not of the greatest importance whether the stump of umbilical cord has come away during this period; whether the umbilicus heals quickly or late, and how great is the secretion which accompanies this process. The important element is the absolute prevention of severe or fatal infection at the umbilicus. Any method to be successful must be so simple that it can be used by midwives. While it may be difficult to induce the older midwives to understand and carry out a method perfectly, still with the younger women this should be possible.

That many children in maternities or in their own homes die of umbilical infection cannot be denied. To ascertain the cause of these deaths one would be obliged to make thorough autopsy upon all children dying in a given hospital and compare the autopsy findings with the clinical histories. It must also be remembered that fetal infection at the umbilicus may occur, which gives no apparent sign of its existence.

The number of cases under consideration for the last three years was, in round numbers, 5000 children discharged living from the hospital. Between the years 1905 and 1911 there were 9946 births. Autopsies were made in all cases and in 7 umbilical infection was returned as the cause of death.

In 10,000 children, 1 fatal case of umbilical infection occurred in 1428 newly born, a percentage of 0.07. Had not a system of prophylactic treatment been installed, from 2800 to 3000 children in the 10,000 would have perished.

Since the year 1901, the daily bath of the children has been conducted after certain approved methods. Since February, 1908, the umbilical cord has been severed close to the stump, and the stump treated with leniset cotton or gauze, and the whole held in place by adhesive plaster. In February, 1910, the stump of the cord began to be treated with alcohol, cotton, and gauze, so held in place that the gauze, if necessary, could be renewed and kept in position by an adherent bandage. During this period but 3 cases of infection developed. In 1911, the procedure was introduced of treating the cord with balsam of Peru and protecting it with a firm dressing and bandage. After trying various clamps, von Herff's clamp was adopted.

In the last 5000 children born during the three years, 1912, 1913 and 1914 inclusive, there was no case of death from umbilical infection. In the effort to secure an efficient and cheap dressing a bandage impregnated with sugar, to which was added a small percentage of salicylic acid or a preparation of naphthol, has been tried. The writer does not assert that any one method is the only good one, and realizes that success in this direction depends largely upon the intelligence and fidelity of personal attendants.

The Influence of Syphilis on the Chances of Progeny. Harman,¹ in studying the case papers of 1100 children, found in a large number in which blindness was the undoubted effect of parental syphilis, that the family history had been investigated; that the mother of the child had been seen and the history of her married life, so far as its results in pregnancies and the births of children were concerned, had been collected. These detailed family histories numbered 150. In each of these families one or more of the children have been under observation, sometimes for many years, and were sufferers from congenital or inherited syphilis. These children were blind either from interstitial keratitis, iritis, or disseminated choroiditis. There were other undoubted signs of syphilis in Hutchinsonian teeth, radiating scars at the angles of the mouth, evidences of bone or joint disease, laceration of the nose or palate, and deafness. Although blood tests may not be decisive there was no question concerning the accuracy of the diagnosis of syphilis in these cases. Hutchinsonian teeth alone give a certain diagnosis, and, when this form of teeth is present, with one or more of the other clinical characteristics, there can be no question concerning the condition. In 68.5 per cent. Hutchinsonian teeth were present in the blind child of the family, and besides the condition of the teeth, several other symptoms were noted. Among the eleven families to which only one child was born there were four illegitimate unions and their progeny. All of these eleven children were blind and alive at the time of the inquiry.

The history of these 150 families proves distinctly the great influence of hereditary syphilis upon children. In a second series an inquiry was made into the family history of women attending the West London Hospital. They were a little poorer than the average of the syphilitic parents whose histories have been obtained. The results of the comparison of the two groups are seen in tables.

In the first 150 syphilitic families there were 390 healthy children, 92 miscarriages, 80 stillbirths, 229 infant deaths, and 210 children affected by syphilis.

In the second group of 150 healthy families not known to be affected by syphilis, there were living 654 healthy children, there had been 61 miscarriages, 17 stillbirths, and 94 infant deaths. This comparison can be graphically made by adjacent columns of different color, showing the results still more strikingly. When one considers the matter in rates per 1000, syphilitic parents had 390 healthy children; healthy parents, 791.7. Among the syphilitics, 92 had miscarriages; among the healthy, 75.8. Among the syphilitics there were 80 stillbirths per 1000; among the healthy, 20.5 per 1000. Among the syphilitics there were 229 infant deaths per 1000; among the healthy, 113.8 per 1000. Among those of syphilitic parentage there were 210 children affected with syphilis.

¹ British Medical Journal, February 5, 1916.

The Transfusion of Blood in the Newborn. Cherry and Lacgrock¹ give the frequency of hemolysis in the newborn, and find 32 out of 5000 at the Boston Lying-in Charity Hospital; 190 cases in 13,000 births in the maternity hospital at Prague; 8 per cent. at the New York Foundling Hospital, while the average text-books upon the subject of children's disorders give the proportion of 1 in every 1000 births. Clinically, these cases are of two classes: (1) those in which hemorrhage may occur from the mucosa of the gastric tract, from the stump or the cord, and subsequently in which diagnosis is readily made by the appearance of blood; (2) those cases in which hemorrhage may occur in some internal organ, such as the suprarenals, peritoneal cavity, brain, or lungs. In these, diagnosis may not be made at an early date and when finally arrived at the patient is almost exsanguinated and the condition very critical. The writers treated these cases by transferring blood from the mother to the infant. It was thought best to make a preliminary hemolytic and agglutinin test before using the mother as a donor for her infant. There are several advantages to this procedure, one of which is that the mother is usually available at once, should an emergency suggest this method of treatment. Then, when the bleeding is discovered during the night, where it would be difficult to secure another donor, the mother would be at hand, and in the third place where no laboratory is at hand, it is advantageous to know that a compatible donor is nearby. So there is some advantage in the cheapness of this method of treatment.

Under certain circumstances, emergency transfusions have been done without a preliminary hemolytic test. Under these circumstances the mother might readily be selected as the donor for her child. Thirty-four tests were made to establish the fact of the complete comparability between the blood of the mother and child. These were made under the strictest antiseptic precautions; the mothers were bled from the vein at the bend of the elbow, about 20 c.c. of blood being taken. Five cubic centimeters of this was placed in a tube containing glass beads and the tube was shaken for five minutes. The remaining 15 c.c. of blood was placed in a test-tube on a slant, was kept at a warm temperature, and afterward placed in the incubator at 37° C. to separate the serum. Twenty-three babies were bled by a deep incision in the heel, and the blood made to flow by compressing the lower part of the leg. Blood was obtained from the fetal end of the cord by ligation. This blood was treated like the mother's. The defibrinated blood was washed and centrifuged three times in salt solution. With the washed corpuscles a 5 per cent. suspension was made, and by mixing the two the mother's cells were treated with baby serum and the baby's cells with mother's serum. In 34 tests no hemolysis or agglutination occurred. These

¹ Journal of the American Medical Association, February 26, 1916.

tests show that mothers can be used as donors for the transfusion of blood, provided the mother has no pathological condition which forbids.

Since these experiments, one bleeding baby was transfused at the Harlem Hospital. Hemorrhage began at the second day of the child's life from the nose, bowels, cord, and kidneys. The mother was used as donor and the infant was transfused with 60 c.c. of blood through the external jugular vein by the indirect syringe procedure. One hour after transfusion no bleeding occurred in the wound made over the jugular vein and six hours later the stools were free from macroscopic blood, and there was no bleeding from any part of the infant's body. It has been estimated that the volume of blood possessed by an infant is one-tenth of its body weight, so an infant weighing 7 pounds would transmit $5\frac{2}{3}$ ounces. It is well known from clinical observation that the loss of one-third of the entire blood supply brings a patient into great danger. From this it follows that the amount of blood used in transfusion should be, if possible, accurately known. If too much enters the circulation the heart may become acutely dilated and death quickly occur. We have estimated that from 60 to 75 c.c. of blood are sufficient to supply the infant with the necessary elements to promote clotting and enough cellular elements to replace those lost by hemorrhage.

The Diagnosis of Intracranial Bleeding in the Newborn. Sloan¹ concludes, from his study of this subject and his clinical experience, that where birth has been difficult or prolonged, with instrumental delivery, or where spontaneous respiration starts slowly, the newborn infant should be carefully watched for the next few days for signs of cerebral bleeding. The most valuable signs in the localization of the bleeding are early symptoms of cortical irritation. One can distinguish between bleeding above the tentorium and that which occurs below it. When symptoms of general increase in intracranial pressure become marked, a decompression operation should be done. The best results are obtained when decompression is performed while the pulse is still slow, and before respiration becomes irregular.

In general, newborn infants stand operations of all types very well. In brain cases there is an average mortality of 50 per cent. after operation. Loss of blood during these operations must be carefully avoided because it rapidly lowers blood-pressure. The best results are obtained by earlier diagnosis and operation while the infant is in the best possible condition, and before too severe resulting damage has happened to the central nervous system through pressure anemia. So far in his experience, the author has seen no resultant brain damage in those children recovering from operation. In after life they show a marked contrast to the small proportion of infants who survive without operative interference.

¹ Cleveland Medical Journal, December, 1915.

The Care of Prematurely Born Children. Langstein¹ gives the results obtained in the care of 250 prematurely born children in the Institute at Berlin.

In place of the ordinary incubator the incubation room devised by Escherich is used, having a humidity of 60 per cent. and a temperature ranging from 70° to 80°. The results obtained by the use of this room are very satisfactory, and it is much superior to the ordinary incubator. The heat is obtained by the circulation of warm water, and the room is carefully ventilated. Infants are admitted to this room weighing from 900 to 1500 grams and also having a subnormal temperature.

The feeding is usually accomplished by introducing a tube into the stomach through the mouth, and very small quantities of nourishment are given. At first small quantities of breast milk are used, and the amount very slowly increased until in two weeks' time the children are able to nurse. Premature children are fed, if possible, every two hours, and at least nine to ten meals in the twenty-four hours are given.

When mother's milk is not available, it is often difficult to find a food which agrees, as no one preparation suits all. Mixtures containing a high percentage of fat give the best results, as does buttermilk with cereal preparations and sugar.

Recognizing the tendency of premature children to rachitis and hemophilia, this is taken into consideration in their care. Preparations of calcium are given in the form of phosphate and lactate or a preparation known as tricalcol in combination with cod-liver oil. Iron is also administered, for it is found that premature infants often become anemic, even in the second and third month of life. As regards the relative growth of the newborn, it is found that children from twenty-seven to twenty-eight weeks in intra-uterine life, weighing 1000 grams and 34 cm. long, can develop normally if born at this period. A good prognosis may be given in these cases. Many of the infants prematurely born had been delivered by induced labor, and in these circumstances it is of great importance that the child does not become chilled while being brought to the hospital.

Pulmonary Tuberculosis with Cavities in Nursing Infants. Bergmann² reports the case of a child whose mother had suffered from cough for a long time, who became worse during pregnancy and soon after the confinement died from pulmonary tuberculosis. The child coughed from its birth. It was not nursed by the mother, but artificially fed, and with apparent success. In the beginning of the twelfth week of life, on the seventy-eighth day, the von Pirquet test was positive. On the eighty-second day of the infant's life death occurred. At autopsy both lungs were adherent to the chest wall, and through the entire substance of the lung there were abundant tubercles, some of which

¹ Zentralbl. f. Gynäk., 1915, No. 41.

² Berl. klin. Wchnschr., 1915, No. 4.

had undergone caseation. In the right lower lobe there was a cavity as large as a large walnut and several smaller. In the left upper lobe there were two cavities as large as cherries. There was caseation in the bronchial glands. In the right kidney underneath the superficial tissue and the capsule there were miliary, grayish-white tubercles. In the cecum there were numerous tubercles that had not undergone caseation.

The question is raised how early in life is a von Pirquet test positive. von Zarfal has reported a case on the seventeenth day of the infant's life. Some writers allege that the infant is not capable of having antibodies at so early a period, but those who have experimented with guinea-pigs have proved that antibodies pass from mother to fetus. For this reason it is rational to conclude that the child of a mother who has given a positive von Pirquet reaction during the time just preceding, or immediately after its birth, should also give a positive reaction if the child itself is tuberculous. It is thought that the tuberculous process proceeds from the placenta, and Schmorl estimates that this is the cause in 45 per cent. of tuberculous women, and that in infants the tubercular infection frequently attacks the intestine. In 40 nursing infants who were tuberculous, Lebküchner found the tuberculous process most active in 23 in the middle and lower portions of the lungs. In adults, tubercular infection develops first and most actively at the apices. This seems to be because the upper portion of the lung in the adult has the most sluggish circulation and the least function to perform. In the infant, however, the reverse is true, which may account for the site of the tuberculous process.

Some Aspects of Ophthalmia Neonatorum. Derby¹ gives the results of the study of 149 cases of ophthalmia neonatorum in the Massachusetts Charitable Eye and Ear Infirmary.

It is best to take an infant suffering with ophthalmia neonatorum to a hospital for treatment, although some urge against it because the maternal nursing may be interrupted. In hospitals, the mortality among infants suffering from ophthalmia is considerable, and few hospitals have accommodations suitable for them. It is also true that in London it is difficult to care properly for these cases. The general rule, however, prevails that in all severe cases and those in which the process is undoubtedly contagious, hospital treatment should be procured.

Of the 149 cases occurring in fourteen months, 6 died in the hospital, 2 were premature, 1 died of meningitis, 1 of pneumonia, and 2 of hemorrhagic disease of the newborn. Of the cases studied and which were kept under observation for a year it was possible to follow the course of 81. Of these 3 died in the hospital and 4 after their discharge. It is often difficult to obtain accurate figures concerning mortality in this

¹ Journal of the American Medical Association, October 16, 1915.

condition. An adequate system of charts is of importance in order to accurately study these cases. Whenever possible the mothers of these infants should be admitted to hospital, even if she cannot remain, but she should come at least twice daily to nurse the child. If the mother is sick and cannot come to the hospital it is often possible to obtain breast milk from her. If bottle fed only the best quality of milk should be used.

The frequent cleansing, every half-hour, necessary in these cases must be an unfavorable element for the child. This treatment interferes with the warmth, the quiet, and the rest which the child should have. The tendency should be to treat the eyes as infrequently as is consistent with safety. The baby's weight should be carefully watched and if the child is losing ground, the eye treatment should be reduced to once every three or four hours. Treatment should not be given directly after a feeding, as many times the food taken will be regurgitated. The eyes should be treated directly before the feeding and the child should not be disturbed after it as long as possible. The handling of the child should also be reduced to the least possible point, and the chronic discharge from the conjunctiva, which is often seen in children in poor condition, ceases so soon as the general state of the child's health receives attention.

In the series of cases quoted, 17 infants were premature. In 9 of these, the gonococcus was found, 16 of them were under 5 pounds in weight, and 11 between 5 and 6 pounds.

In the 149 cases, 77 were definitely due to the gonococcus. Of these 18 were monocular and remained so—a percentage of 23.4. Forty-four infants out of 75 cases studied on this point developed the disease in both eyes on the same day. Of the remaining, 18 had the disease in one eye only, and, of these, 8 showed evidence of conjunctivitis within three days after birth, while 10 developed it on the fourth day or later; 2 on the fifth; 3 on the sixth; 1 on the ninth, and 1 on the tenth, and 2 later than ten days. It seems probable that over half of monocular infections were secondary and not acquired at birth. In no case did infection of the second eye occur after admission to the hospital. The precautions taken to avoid infection were: that the child should lie on the infected side, its hands and arms being confined and a drop or two of protargol or argyrol put in the healthy eye two or three times a day. While this is valuable it is less important that strict cleanliness.

As regards the germ which caused infection in these cases, the gonococcus was found in 77 of the 149; the clinical picture was characteristic. The percentage is 51.3, lower than the usually quoted two-thirds of all cases. Other authors state that the gonococcus is present in 65 per cent., 54 per cent., and 50 per cent.

In the series quoted by the writer, there were 56 cases in which no organisms whatever could be found in the smear, although in some the suggestion of scraping the conjunctiva was carried out. This large

percentage (38) was undoubtedly owing to the fact that the infants were brought late to the hospital, the average age being over twelve days and almost all of them had had some sort of treatment which had greatly increased the number of organisms. It has been very difficult in these cases to cultivate the gonococcus when obtained from the conjunctiva. In 4 of the gonorrheal cases, staphylococci were obtained in pure culture.

A mild type of infection is described in which the blood was examined in 23 of the gonorrheal patients. In only 2 were the results strongly positive. One of these was an exceptionally severe infection with corneal involvement. In 3 cases the reaction was weakly positive. This result is probably due to the development of immunity in the infant. A Wassermann test was made in 22, and 21 of these were negative. One case was triple positive, showing the lesions of active syphilis. A vaginal discharge was present in 17 out of 100 of the infants, and in 4 the gonococcus was present, in three instances associated with gonorrheal conjunctivitis. One patient was admitted with arthritis. The knee-joint was aspirated and the gonococcus grown in pure cultures.

When the history of the parents was investigated, among 29 fathers there were 18 who gave a history of previous urethritis. Thirty-one mothers had a history of vaginal discharge; 2 admitted syphilis and gonorrhea, and 2 syphilis alone. Thirteen mothers were examined in the hospital clinic, only 4 of whom were without disease.

Involvement of the cornea was present in 24, or 16 per cent. of the cases. In 16 of the 24 the gonococcus was present. Eight of these patients were discharged with one or both corneas damaged. Five had a single eye damaged and in 1 case, owing to the negligence of a nurse, the left cornea was perforated and the right cornea also perforated but with a little sight still remaining.

So far as treatment was concerned the eye was cleaned as often as necessary to keep it reasonably free from pus. The lids were wiped clean, then separated with the fingers, the conjunctiva washed out with boric acid squeezed from a pledget of cotton, several drops of one of the milder silver salts instilled, the excess wiped away, and the lids liberally smeared with a mild ointment. Injury to the corneal epithelium was carefully avoided. In the later stages of the disease silver nitrate and zinc ointment were often used. As regards the preparation of silver employed, in 25 per cent. argyrol was used almost exclusively. Protargol in 2 to 4 per cent. would be equally efficient.

Before discharging these patients two negative smears at an interval of twenty-four hours or over are required.

Infant Mortality Due to Labor. Bacon¹ finds that in the United States, 65,000 stillbirths and 80,000 deaths subsequent to birth may be

¹ Journal of the American Medical Association, June 19, 1915.

attributed to labor. This would give a fetal mortality due to labor of 24,000 births from three varieties of malpresentation. As regards the use of forceps, the instrument is probably used in from 6 to 7 per cent. of all labors. In these a fetal mortality of 15 per cent. is undoubtedly conservative. We may add to these sources of infant mortality the toxemia of pregnancy in its various degrees, causing 4000 fetal deaths each year; rupture of the uterus and complications arising from the placenta, which cause 1600 to 2000 fetal deaths annually. If the subject matter is put in percentages we find malpresentations occasioning 30 per cent., forceps operations 30 per cent., miscellaneous causes, including abnormal conditions of the placenta and toxemia, 15 per cent., and compression from uterine contractions 25 per cent.

Birth Palsy. Blatt¹ believes that birth palsy occurs more frequently than once in 2000 births. In the greater number of cases the condition develops after a prolonged and difficult labor, in which there is disproportion between the size of the child and the maternal pelvis. The injury occurs more frequently in vertex than in breech presentations. There are two opposing theories to explain the etiology of birth palsy. In one the accident follows stretching or tearing of the brachial plexus. In accordance with the second there is a primary joint or bone lesion, with or without secondary paralytic phenomena.

Usually after a difficult labor in which instruments may or may not have been used, one arm of the infant hangs limp and motionless. The neck and shoulder may be tender for a few days, and if the infant receives no treatment it may recover, or there may be a complete absence of recovery with persistence of a flail limb, or a partial recovery may take place. This last is the usual result. There is often a mechanical obstacle to the use of the arm through fixation of the shoulder in the position of internal rotation, the result of shortening of the subscapularis tendon and the adjacent joint capsule. There may be some flexion contraction at the elbow or pronation contraction of the forearm. This increases as the child grows older. Usually the muscles are a little wasted. If the shoulder be carefully examined the humerus is found no longer in concentric apposition with the glenoid; there is commencing subluxation of the joint. The x-ray picture is typical, showing an undeveloped humerus and scapula.

While opinions differ regarding the two theories as to the etiology of the condition, a point of practical interest is the treatment.

In the first few days the arm must be fixed without delay in the position of relaxation of the paralyzed muscles, that is, abducted to 90 degrees and rotated out fully at the shoulder, flexed to a right angle at the elbow with the forearm fully supinated and the wrist and fingers hyper-extended. Splints are often used to maintain this position, or in

¹ British Medical Journal, May 8, 1915.

older children, a plaster of Paris shell may be made but the position of relaxation must be constantly kept up night and day. The most essential part of the treatment in the early stages is the maintenance of the arm in the splint in the correct posture. Recovery is usually rapid in the hand and forearm, the shoulder muscles lagging behind somewhat. In testing the recovery, electrical reactions in the paralyzed muscles are not of much practical importance.

The results of operations on the plexus in infants have been uniformly poor. Nerve anastomosis in the plexus region is usually unsatisfactory.

When cases have been neglected for several months there is internal rotation deformity of the shoulder. After the position of the head of the humerus has been carefully ascertained under anesthesia, a contracted capsule should be stretched and the limb placed in the same position used in the first stage. If the capsule cannot be stretched fully by manipulation an open operation may be necessary.

In cases of posterior subluxation of the shoulder-joint, reduction may occasionally be accomplished during the early stages of the subluxation without an anesthetic, but generally the deformity is so fixed as to demand considerable force. Arthrotomy is sometimes indicated.

Fatal Gastro-intestinal Hemorrhage in the Newborn. Sheill¹ reported the case of an infant, aged two days, that bled violently from the bowels and stomach. Horse serum was injected subcutaneously followed by the rapid recovery of the child.

In discussion, others reported good results from serum, and some cases where severe hemorrhage had ceased without treatment.

Icterus in the Newborn. In the *Zeitschrift f. Geburtshülfe und Gynäkologie*, 1915, Band lxxvi, Heft 3, are published two papers upon this subject, one from the Pathological Institute of the University of Halle by Pfälzter, the other from Veit's Clinic by Heynemann.

In the first paper autopsy reports on cases are published, showing that the lesion is largely one which attacks the nuclei of the epithelia of the body. Infectious process occurs in the first days of life and there is abundant opportunity for this not only during birth but immediately afterward. The umbilical wound affords ready access for bacteria; virulent bacteria found in the vagina can readily infect the infant; the *Bacillus coli communis* is frequently the germ present.

Heynemann's paper is concerned with studies of the blood and physiological processes in the newborn, and gives the results obtained in autopsy upon a large number of cases. He believes that icterus is usually to be traced to a great disturbance in the functions of the liver cells occurring during the first days of life. The circumstances favorable for this are the congested condition of the liver and the great number of red blood cells there present. The cause of the disintegra-

¹ Journal of Obstetrics and Gynecology of the British Empire, January 31, 1915.

tion of red blood cells in these cases is not fully known. It seems probable that it has to do with the activity of certain cells in the liver.

Congenital Defects of the Anus and Rectum. Brenner¹ draws attention to these conditions, and by a study of the literature shows that they were recognized and operated upon at very early times. The writer presents the results of a study of 61 cases treated since the advent of aseptic surgery. Recto-anal malformations result from faulty development during the first two months of fetal life. Some type of recto-anal malformation occurs once in approximately every 5000, with a sex ratio of 5 per cent. in favor of males. Anal defects are most frequent. Then come malformations with abnormal openings—vaginal or urinary. In cases of partial occlusion of the bowel gradual dilatation may be practised or proctotomy. Occlusion of the anus is accomplished by a membranous diaphragm of variable thickness and firmness. It is treated by a crucial incision and the diagnosis is self-evident upon local examination. The treatment consists in a crucial incision of the membrane with excision of the flaps if they are firm and redundant, followed by systematic dilatation with bougies. The operation should be performed early and without anesthesia.

Total absence of the anus, the rectum ending in a blind pouch, is the most common type of anal deformity. Many cases are overlooked at birth until absence of discharges from the bowel and progressive abdominal distention call attention to the condition. Distention is a late symptom, usually not occurring in the first forty-eight hours, as the intestinal tract of the newborn is sterile. Without treatment these cases perish in a few days.

Opinion is divided as to whether operative treatment should be attempted at once or after forty-eight hours. If the child is in good condition it should be done in the first twenty-four hours. After incision the rectum should be brought down and incised and attached to the surrounding tissue. The operation should be performed in from five to eight minutes. Should this be unsuccessful, a left inguinal colostomy must be done.

A total absence of the anus with the rectum opening into the bladder, urethral, vaginal, perineal or sacral regions is the condition present in 40 per cent. of all cases. Many of these are never discovered and occasion little, if any, disturbance in function. Cases with vesicle communication require early operation to escape ascending kidney infection. The operation varies in accordance with the anatomical conditions present. Other abnormalities are found less frequently.

As regards the results of treatment in these cases, perineal dissection for fistulous openings gives good results and is a safe procedure. Perineoplasties for anal or anorectal obstruction gave a surgical mortality of

¹ Surgery, Gynecology and Obstetrics, May, 1915.

24 per cent., much larger than in the period of aseptic surgery. Inguinal colostomy, although some believe that it should be performed at the very beginning of the case, is attended with a high mortality, 60.6 per cent., and is to be condemned except as a last resort.

The author adds the case of an infant under his observation where there was no opening to the rectum but a slight dimple at the anal site. Operation was undertaken within twenty-four hours, the patient (a male child) being placed in the exaggerated lithotomy position with a probe in the bladder. A perineal incision was made extending from the scrotum to the coccyx and in the midline to the pelvic perineum and the coccyx was bisected. Bleeding was controlled and a greenish pouch seen through the perineum. This was opened and the rectum brought down and sutured with silk to the anal site and the perineal wound closed. The rectum was opened and meconium evacuated and found to be sterile. The child died thirty-two hours after operation with repeated vomiting. The meconium remained sterile and the wound was intact. At autopsy, in addition to the abnormal condition of the rectum there was biliary stenosis, absence of the gall-bladder, and stricture of both ureters.

The Operative Treatment of Pyloric Obstruction in Infants. Downes,¹ in April, 1914, reported the operative results obtained in 22 cases of pyloric obstruction in infants. Since that report was made 44 additional cases have come under the writer's care; a total of 66 cases observed in five and a half years. With one exception there was the characteristic tumor at the pylorus; all showed marked hypertrophy of the band of circular muscle fibers, with the redundant, thickened mucous membrane lying in longitudinal folds. In the single exception noted, the tumor, while of considerable size, was less firm and the muscle not more than half of the average case. These differences were observed at the time of operation but their significance was not appreciated. After the operation the baby continued to vomit and died in eighteen hours. At autopsy a small tumor originating in the muscularis mucosa and projecting into and filling the lumen of the pylorus was found.

Most of the stomachs were of average size; a few very large; 2 or 3 very small, 1 holding only 1 ounce. There was swelling in different degrees in all cases and in a few throughout the stomach wall. This edema is a very important condition.

The theory which seems best to explain these cases is that at birth there is present a true malformation which consists of an abnormal thickening of the circular muscle of the pylorus. In the effort to force food through this narrow channel, circulatory disturbances are produced which cause edema. As the quantity of food is increased the effort becomes greater, the lumen narrows down until about the tenth day it

¹ Surgery, Gynecology and Obstetrics, March, 1916.

is more or less completely obstructed. The clinical facts bear out this theory because if the child's food be greatly reduced in quantity and the stomach be frequently irrigated the child grows better, but becomes worse as soon as the food is again increased. Up to the present time there is no proof that a definite persistent spasm of the pylorus exists without hypertrophy.

The symptoms are projectile vomiting, true peristaltic waves, gastric retention, and rapid loss of weight. The treatment consists in operation. Richter, Scudder, and the writer have operated on the largest number of cases. At first the operation chosen was posterogastro-enterostomy. The total number of cases was 61, and a mortality of 22 per cent. In the cases of the writer, gastro-enterostomy had a mortality above 30 per cent. This was due to the fact that many of the infants were in a critical condition when admitted, and that operation was refused in no case.

In the later series the partial pyloroplasty of Rammstedt was given a trial with satisfactory results. Of the 66 infants, 31 had gastro-enterostomy and 36 Rammstedt's operation. In 19 of the latter a sound was passed through the pylorus after the muscle had been divided. The sound was introduced through a small incision made in the stomach while some distance from the pylorus.

The gastro-enterostomies were done according to the posterior no-loop method, with the exception of the first 2 cases in which no clamps were used.

The partial pyloroplasty was done by making a longitudinal incision from 2 to 3 cm. in length through the serosa tissue, and the hypertrophied circular muscle fibers of the pylorus down to the thickened mucosa. The pyloric tumor should be held firmly between the thumb and index finger as the incision is deepened. The edges of the wound are forced gently apart. When the muscle is cut there can be seen a line of cleavage between the muscle and the mucous membrane. A small pair of blunt-pointed, curved scissors may be used to advantage in spreading the incision. If the muscle is freely divided the mucous membrane projects into the wound. There is usually but little bleeding, as a rule, controlled by applying hot pads. No sutures are taken and the tumor is dropped back into the abdomen and the wound closed.

Occasionally the operator opens the intestine because the change from the thickened pylorus to the normal duodenum is so sudden that the knife may go further than he has intended. Such openings should be immediately closed and no bad result need follow. No stitches should be taken nor should any effort be made to close the wounds with flaps from the muscle nor to cover it with omentum. Experience showed that the passage of the sound might be dangerous because of the difficulty in properly closing the incision in the stomach through which the sound was passed. It was therefore abandoned.

The smallest baby in the series weighed 3 pounds 15 ounces and the largest 9 pounds 9 ounces. The average weight was 6 pounds 8 ounces. The smallest baby that recovered after gastro-enterostomy weighed 5 pounds; after Rammstedt's operation, 4 pounds.

The mortality of gastro-enterostomy was 35 per cent. Of the 20 cases discharged as cured, 2 died within a short time of acute gastro-enteritis; 1 died in three months of diphtheria; the remaining 17 are living at the time of writing, well, and developing normally in every way. In the cases treated by gastro-enterostomy there was a group of 6 dying from five to nineteen days after operation. One died of acute nephritis; 3 had persistent vomiting and exhaustion, and 1 of these was operated on a second time shortly before death, but no cause could be found for the persistent vomiting. In none of the cases did autopsy show peritonitis or any other adequate cause of death excepting in 1, nephritis.

Of the 35 partial pyloroplasties there was a mortality of 23 per cent., or 8. Two died of peritonitis through leakage from an incision in the stomach; 1 from a small tumor undiscovered; and 4 were moribund at the time of operation. Twenty-seven were discharged as cured. One of these died of convulsions shortly after leaving the hospital, and no autopsy could be obtained. One returned to the hospital three months after operation with endocarditis and pericarditis which proved fatal. The stomach, removed at autopsy, showed an elliptical cicatrix of the anterior surface of the pylorus about half the size of the original wound. This was covered with serosa and appeared to be composed of serous and mucous coats only. The tumor found at operation had disappeared.

The remaining 25 are in good condition. Röntgen-ray examinations have been made and the tissues closely resemble the normal. The success was better than those who had gastro-enterostomy, for the latter sometimes developed diarrhea which, in 2 cases, proved fatal.

After the Rammstedt operation feeding is given in two hours. Two or 3 drams of breast milk, alternating with water, is given every two hours to start with, and repeatedly increased until the patient is getting from 1 to 1.5 ounces every three hours at the end of the second day. The gastro-enterostomy cases required more care in feeding and did not do so well.

In comparing the two operations partial pyloroplasty has many advantages over gastro-enterostomy. It is done much more rapidly, reaction is more prompt, feeding is given earlier and can be pushed more rapidly, postoperative vomiting is less, and such complications as diarrhea and unexplained vomiting do not occur, the obstruction is permanently removed and the normal continuity of the alimentary tract is preserved.

It may be said in criticism that the operation leaves an uncovered

wound, and that the abdominal cavity is only protected from contamination by a thin layer of mucous membrane and that as the scar contracts the obstruction will re-form. These criticisms are not borne out in experience. In estimating the results of this operation as in all others, a very important element is the length of time elapsing between the onset of symptoms and the time of operation.

Enlarged Thymus in Infants. Herrick¹ reports 6 cases of enlarged thymus complicating infancy. In the first case it was thought that a foreign body was in the air passage although the x-ray proved the contrary. However, tracheotomy was performed under anesthesia, but as soon as the first incision was made the child stopped breathing and could not be resuscitated. On autopsy no foreign body was found, but a very large thymus.

In the second case x-ray treatment was advised but the child resisted manipulation so strongly that the treatments were unsatisfactory. Ten days after the child was first seen in consultation, it died in an attack of pressure and dyspnea, and an autopsy could not be obtained.

In the third case operation was refused and the child passed from observation.

In the fourth case as soon as symptoms were well developed, x-ray treatment was used every day for the first week, then every second or third day, and then twice a week; in all, 20 treatments. The child improved from the beginning of the treatment. There was a steady improvement and recovery. Sixteen months after the treatment was started the child remained well.

The fifth case resembled the fourth in the success of the x-ray treatment. In the sixth x-ray treatment was also successful.

The cases ranged in age from four weeks to three years, the average being eleven months. In 2 cases the first symptoms appeared a week after birth; in 1, at two weeks; 1, at two and a half months; 1, at the end of a year, and one at the end of three years.

This paper would indicate that in the present stage of our knowledge, x-ray treatment is the most useful and efficient agency which we have.

In the experience of the reviewer, a child had enlarged thymus accompanied by dilation of the superficial vessels in several areas upon the head and face. Without any provocation the child would be taken with attacks of dyspnea and weak action of the heart which threatened death. It was kept under the charge of an efficient trained nurse, and when the attacks came on atropin was given hypodermically and frequently strychnin and digitalin. The attacks gradually subsided, the areas of dilated vessels became much smaller, and the child gradually developed into a vigorous and very active child. In the observation of the reviewer, sudden death occurring among infants may often

¹ Surgery, Gynecology and Obstetrics, March, 1916.

be ascribed to the pressure of the thymus gland upon important structures in the neck. In a published paper he has drawn attention to the this fact, illustrated by drawings from a case.

Conservation of Vision and the Prevention of Blindness. de Schweinitz¹ estimates that 10,000 men, women, and children in this country are blind, and that one-fourth of these need not have lost their sight. Of the inmates of schools and asylums for the blind 25 per cent. lost their vision through ophthalmia neonatorum. Sixty-five per cent. of the cases of ophthalmia are due to a distinct germ causing approximately 8 per cent. of the blindness in most parts of the country.

To prevent this education is an important agent. Compulsory prophylaxis and the free distribution of a prophylactic remedy, with instructions concerning its use, are also important. The ravages of ophthalmia may be understood to some extent when it is computed that, in one city of this union, 100 of the young blind have lost sight and that this will cost the city for education about \$300,000, while the economic loss to the commonwealth because of their life-long dependency will be many times that amount.

Trachoma and glaucoma are also important factors in producing blindness, and in the management of these cases among the poor, great assistance can be given by a social service.

The work of a national committee should be of great value in dealing with this matter, while schools for the blind and for those with damaged vision are urgently needed.

The Origin of Icterus in the Newborn. Bang² gives the results of the investigation in the Maternity at Copenhagen. The method consists in determining the quantity of biliary coloring matter in the blood, and this is known under the name of Gmelin's reaction.

Gilbert has applied Gmelin's method to the study of serums. He compares the serum of a normal child and the serum of a child having icterus. Nitric acid is the agent employed in making the comparative coloring tests.

Schiel, of Christiania, and Sunde have modified the method somewhat. The agent employed in securing the reaction consists of nitric acid and nitrate of sodium.

There are practically three methods to determine the quantity of biliary coloring matter in the blood. One consists in extracting bilirubin from the blood with alcohol with the addition of Ehrlich's diazo reaction agent. The method of Biffi and Galli consists in comparing a chloroform extract of serum with a solution of chromate of potassium. The third method is that of Ylppo, which transforms bilirubin into biliverdin during the extraction. To do this several cubic centimeters of

¹ Journal of American Medical Association, February 5, 1916.

² Archives Mensuelles d'Obstétrique et de Gynécologie, August, 1915.

blood are taken from a finger and the blood dropped directed into a solution of salt which delays the clotting of the blood without producing hemolysis. Coagulation of the red blood cells of the centrifuged solution is obtained which is treated with chloroform to dissolve its coloring matter. By the use of a modification of the spectroscope the quantities of bilirubin and biliverdin may be determined from this solution. This method was applied to infants in the wards of the hospital.

The author found that if the blood of the newborn be examined a few hours after birth, there is a great increase above the average number of red blood cells. This can be explained as a condition of stasis in the capillaries of the skin. The percentage of hemaglobin gradually returns to the average percentage as the child adopts itself to extra-uterine life. Infants are born with a greater quantity of bile pigment in the blood that is found in normal adults.

During the first hours and days after birth there is an increase in the bile pigments of the blood, followed by a very gradual diminution. This condition of affairs is natural and physiological, for it is found in all newborn. The progress of that phenomena corresponds with the variations in the quantity of hemaglobin in the blood. An increase can often be explained as the consequences of the great changes incident to the cessation of intra-uterine life and the beginning of extra-uterine existence. The result of this is to produce a hepatic stasis, and this brings about the absorption of the bile pigment in the blood.

The Prevalence of Congenital Syphilis Among the Newborn of the East End of London. Fildes¹ arranged to perform Wassermann tests upon 1000 infants soon after birth, and again upon the same infants and their mothers at a certain period after birth. The bacteriological work was done in the laboratory of the London Hospital. Blood was taken from the umbilical cord at birth and collected in a test-tube from the placental end of the cut cord and sent to the laboratory; while the blood from the babies and their mothers at a subsequent examination was taken from the great toe or thumb by Wright's capsules. It is necessary to take the blood from the placenta instead of the infant because it is not possible to get sufficient by Wright's capsule or from the umbilical end of the cord. The blood, however, is easily obtained from the placental end.

At the houses of patients the placental blood was taken by nurses and the specimens were tested once a week, and if a positive reaction was obtained the nurse and students made an investigation for the evidence of syphilis. Two and a half months after the birth of the first baby, and from two and a half to four months after each successive child, the mothers were asked to bring their babies to the hospital for inspection. About 300 responded.

¹ Journal of Obstetrics and Gynecology of the British Empire, March-May, 1915.

The population investigated consisted of persons supposed to be respectable, and the women were said to be married. There was 1 per cent. of aliens among those studied. A Wassermann reaction was carried out upon 1015 different sera collected at birth from the placental end of the cord, and a positive reaction was found in 14, or 1.3 per cent. The children were examined, and with only one exception, declared healthy. It seemed that a positive placental reaction at birth was very seldom due to a syphilitic infection of the infant but merely from the passage of syphilitic substance from the blood of a syphilitic mother.

During the early months of life it was possible to study the reaction on 660 babies. Of these, 3 positive reactions were obtained, or 0.45 per cent.

In general the great majority of cases of congenital syphilis will develop a Wassermann reaction in two and a half to four months after birth. The population examined seemed a fair sample of the so-called respectable laboring classes throughout London. Among these people only 1 baby in 1015 showed signs of syphilis at birth. Three in 600 developed syphilis, and of these only 1 showed symptoms. There were 4 cases of syphilis detected among 677 babies, or 5.9 per 1000, of whom 1 died and 2 showed no symptoms. But 1 child died of syphilis, while 16 were lost, presumably from other causes. 3.9 per 100, or 27 of the women in all, gave a positive reaction, but of these only 4 transmitted syphilis. The Wassermann reaction obtained from blood from the placental end of the umbilical cord is not diagnostic of syphilis in the infant, but of syphilis in the mother. However, only a minority of syphilitic women induced this positive reaction in the umbilical cord and only a minority of syphilitic children gave this reaction at birth.

Congenital Prolapse of the Uterus with Spina Bifida in the Newborn.

Abeler and Duncker¹ describe the case of an infant born with prolapse of the uterus and spina bifida. The child was brought to the clinic by the family physician three days after its birth because it had a spina bifida and deformity in both feet. The labor was said to have been normal and spontaneous, and without the help of a physician, but a few hours longer than the mother's preceding labors in which perfectly healthy children had been born. No information could be obtained as to the position and presentation of the fetus, or whether the quantity of amniotic liquid was normal. The mother consented to have the child brought to the hospital to correct the deformity of the feet and also to have an operation performed to remove the tumor from the back.

On examination, the child, three days old, was a female of average body weight, red skin, active movements of the arms and legs. The head was thrown somewhat backward. The stump of the umbilical cord was aseptic and in the process of drying. There were no evidences

¹ Ztschr. f. Geburtsh. u. Gynäk., 1915, Band lxxvii, Heft 1.

of injury during birth upon the child's body. The spina bifida tumor presented the usual appearance. There was incontinence of meconium and urine, and there was no sphincter reflex. When the child cried and made pressure upon the abdomen the mucous membrane of the bowel prolapsed. There seemed to be nothing abnormal about the vulva. Both feet were deformed but the child seemed well nourished and nursed well. The spina bifida was treated by operation and the child did well for three days, when on the third day there was observed prolapse of the uterus with complete incontinence of urine. The uterus was readily replaced but prolapsed again when the child cried. On the fifth day the lower part of the wound had united and some of the stitches were removed. The edges had gaped asunder somewhat and infection had occurred. The child had spasms with opisthotonos and fever. It gradually, however, became somewhat better although it had occasional convulsions. On the twelfth day after the operation the uterus had completely prolapsed, dragging down the vaginal mucous membrane with it. The child, however, gained in strength and the first wound healed. Fifteen days after the operation it was taken to the mother's home to be cared for by the family physician.

The writers quote a similar case from the literature and append a bibliography.

Severe Jaundice in the Newborn Child. Spiller¹ reports 4 cases of children in whom severe jaundice in infancy had caused cerebral disease.

The first case was seen when three years old, the fifth child, the others healthy. The labor was normal but the child had severe jaundice when one week old and was probably unconscious. After three days this disappeared. The child was unable to hold up the head for a year, and until she was three years old, was unable to rise to a sitting posture when lying on the floor. There were choreiform movements of the whole body. The limbs were poorly developed and rigid, both feet turned inward and she wore out the toes of her shoes. The child had spastic ataxic diplegia.

The second case was born prematurely, had jaundice on the fourth day lasting for six weeks. The child narrowly escaped death. Symptoms of irritation of the nervous system were discovered as the child recovered from its jaundice. There were impairments in the muscular movements and reflexes, and the jaundice was thought to have been an important factor.

In the third case, severe jaundice developed after birth, and in a few days the child was very ill and for weeks was not expected to live. The child had been slow in walking and in talking, and there were abnormal conditions of the muscles. This condition was referred to the unusually severe jaundice.

¹ American Journal of the Medical Sciences, March, 1915.

The fourth case was the second child, healthy at birth, born in normal labor. Severe jaundice began on the third day and lasted three months. At five months of age the child could not hold up its head, the mouth was held open, the child was unable to sit without support as the back was weak. It was badly nourished and could not hold anything in her hands, but would try to grasp the mother's fingers. There was difficulty in swallowing.

A review of the literature is appended, and there seems no reason to doubt but that jaundice in the newborn may permanently damage the nervous system.

The Study of Hydrops Universalis Fetus, with the Report of a Case. Schumann¹ reports the case of a primipara, aged twenty-three years, who in her first pregnancy had kidney insufficiency of moderate degree. Labor was induced at the thirty-sixth week for a moderate pelvic contraction and a healthy child was spontaneously born. The patient slowly recovered from her kidney condition. In the second pregnancy there were severe vomiting and nausea for the first four months. At the seventh month she suffered severe pain in the right iliac fossa, and apparently had appendicitis which subsided under medical treatment. She then had hydramnios and came into labor, and with rupture of the membranes a gallon of amniotic liquid escaped. The child was born in a long and tedious labor, and although the heart beat feebly, the child did not breathe. The mother made a good recovery but was evidently toxic.

The child had marked general edema, so great as to almost obliterate the features. There was a large ascites, hydropericardium, and hydrothorax. The placenta weighed 4.5 pounds, was soft, friable, pale, and enormously edemic. On section, serous fluid escaped from it freely. Microscopically, the villi showed great edema. The cord was thick and edematous, but showed no other change.

A study of the literature shows that cases reported may be divided into those in which the edema is due to some mechanical or structural effect of the fetus in its membranes, and those due to toxemia of the mother, and secondly, to the fetus without any morphologic defect being present.

It is usually present in women who have had some form of toxemia during pregnancy. The effects on the placenta are edema and degeneration.

The reviewer has now under observation an infant born by Cesarean section from a mother who had been highly toxic during pregnancy, and had been in the Maternity Department of the Jefferson Hospital receiving treatment for this for some months before delivery. The edema appeared in the infant between the third and fourth weeks after

¹ American Journal of Obstetrics, December, 1915.

delivery, and seemed to have been precipitated by the failure of the mother's milk, necessitating artificial feeding. The edema is universal, but especially noticeable upon the face, the eyes being practically closed. There is a lack of ability to take food, diminished excretions and diminished strength. The condition is due to no congenital anatomical defect, because the infant was normal at birth and after birth until two and a half weeks of extra-uterine life had passed. There is about the mother no acute infectious process, and the case is evidently one of the toxemic varieties.

Institutional Mortality of the Newborn. Holt and Babbitt¹ believe that the best recent statistics show one-third of the deaths of the first year occur in the first month of life, and of these, seven-eighths in the first two weeks. Using their own statistics to supplement this, the writers state that of 100 infants' deaths during the first year, approximately 33 occur in the first month; 28 in the first two weeks; 22 in the first week, and 13 on the first day. The reduction in infant mortality has come about through the lessening of the mortality from diarrhea and diseases of nutrition. There has also been some improvement in the mortality of diseases of the respiratory tract and all contagious disorders, but there has practically been nothing done in reducing the large group of deaths in the first month. At this time diagnosis is most difficult, and the records of vital statistics are very unreliable.

The writers have utilized the records of the Sloan Hospital for Women in New York to study 10,000 consecutive confinements in the Sloan Maternity occurring in about six and a half years. Of these there were abortions, 253; stillbirths, 429; living births, 9318. The average stay of the patients in the hospital is fourteen days after the birth of the child.

In 9318 infants born living there were, during the first fourteen days, 291 deaths, 3.1 per cent.; of these 159, 54.6 per cent., were in premature infants; 132, or 45.4 per cent., in those born at term. Evidently, prematurity is the largest single factor in infant mortality during the first two weeks of life. Tabulation shows that the great majority of premature and of full-term infants perishing in the first fourteen days die before the end of the first week of life; next in fatality is the first day of life, when 1.5 per cent. died. Nearly one-half, 48 per cent., of the deaths of the first two weeks occurred on the first day. The report of Kerness,² in the Munich Clinic, for four years gives the same mortality, 2.5 per cent., for 9610 living births during the first eight days of life.

As a standard of prematurity, infants are so considered who measure less than 46 cm. in length, and those whose weight was less than 5

¹ Journal of the American Medical Association, January 23, 1915.

² Zeitschrift f. Kinderheilkunde, 1912, referate 4-19.

pounds. At the time of birth the infants' condition was regarded as good in only 13 per cent., fair in 31 per cent., but poor in 56 per cent. With premature infants labor was spontaneous in 132 cases and induced in 27 cases.

When the causes of death during the first fourteen days are considered, congenital weakness plays a large part, and this arises from the physical condition of the mother during pregnancy, but not from circumstances connected with the actual labor. Accidents of labor were responsible for comparatively few deaths, but 33; only 1 of which was premature. The most important accidents were intracranial hemorrhage and injuries to the head. Of the intracranial cases, the forceps was used in nearly half and nearly half were breech presentations. There were deaths also from injuries to the head in cases in which the forceps was used or breech presentation had developed. Among the rare causes of death were rupture of the liver, rupture of the umbilical cord, peritoneal hemorrhage.

In 10,000 deliveries the accidents of labor caused death in about 0.33 per cent. of the total number of deaths. Thirty-three, or 8.8 per cent., were due to this cause. Very few of the accidents of labor here mentioned belong to the causes of infant mortality which can be prevented. This low percentage is explained by the fact that the mothers were delivered in a well-equipped hospital with a skilful staff.

There were 12 deaths in all from malformations and congenital disease other than syphilis. There were 4 cardiac malformations, 2 intestinal, 2 of the nervous system, 4 status lymphaticus. It is true that these figures do not represent the number of malformations in 1000 births, but those which caused death in the first fourteen days. There were 4 other deaths in the hospital from malformations between the fourteenth and forty-second day.

Atelectasis caused death in 8.6 per cent. of all deaths. Asphyxia neonatorum ended the life of 8 children born at term, and caused 2.7 per cent. of all deaths in the first fourteen days. These occurred during the first six hours, and all of them on the first day of life.

The records of the Sloan Maternity offer a limited field of observation for congenital syphilis because few women so infected are admitted. The Wassermann test was applied in but a small percentage of cases. Congenital syphilis was called the cause of death of 13 infants during the first fourteen days, 12 premature and 1 born at term. There were, in addition, 6 others that died from syphilis during their stay in the hospital later than fourteen days after birth.

There were no deaths from hemorrhage in premature infants, but 10 in infants born at term; 3.4 per cent. of the deaths of the first fourteen days. Six of these had some form of serum treatment but apparently without effect.

Of the children born at term, 9 died of sepsis; 3 per cent. of the deaths

in the first fourteen days. In the next eleven days there were 5 additional deaths. The deaths from sepsis were scattered over five years; not more than two deaths from this cause ever occurring in one year. This indicates the efficient asepsis of the institution.

Nine per cent. of the deaths during the first fourteen days were from pneumonia. The total number of deaths from this cause was 66, or 17 per cent. of the number of deaths among infants while in the hospital. This is twice as large a mortality as that of the accidents of labor. Next to congenital weakness, pneumonia was the most frequent cause of death. There were several distinct house epidemics of pneumonia. This indicates the danger of bringing children together in institutions, and calls for especial vigilance on the part of the hospital staffs.

It is ordinarily very difficult to obtain accurate statistics of stillbirths. In the 1000 confinements there were 429, or 4.29 per cent. When this is compared with the general records of the city it is somewhat less, but the two are strikingly similar.

In comparing the statistics of the hospital and of general practice with infants, it must be remembered that the difficult and complicated cases go to the maternity hospitals. This is offset by the fact that such patients receive the most skilful and efficient treatment. Comparing this with Kerness's report of Munich, to which reference has already been made, we find the latter's to be 5.22 per cent.

When the mode of delivery of cases proving fatal to the infant is studied it is seen that nearly half of these deaths occurred after normal labor. Version with breech presentation and extraction, spontaneous breech labor, and the use of forceps are very nearly similar in mortality, respectively 18, 17, and 13 per cent. Cesarean section has the least fetal mortality, 1.1 per cent. In the causes assigned to the death of the fetus, toxemia of pregnancy is given for 14 per cent.; syphilis, 9 per cent.; prematurity, 4 per cent.; monsters, 2 per cent.; unknown, 21 per cent. Under the head of prolonged, difficult, or complicated labor there was the largest mortality, 45 per cent.

The writers summarize their statistical study with the statement that the deaths in the hospital during the first fourteen days were 3 per cent. of the living births, and for this mortality, prematurity was responsible in half the cases; 48 per cent. of the total number of deaths. Sixty-six per cent. of those caused by prematurity occurred on the first day of life. Congenital weakness and atelectasis together made up 58 per cent. of the total deaths. The so-called accidents of labor, hemorrhage, sepsis, and asphyxia had a strikingly small mortality for the fetus of but 20 per cent. of the deaths during the first fourteen days. Malformations and congenital disease other than syphilis, and syphilis had the same mortality rate of 4 per cent. After birth the only important disease developing was pneumonia.

One of the large problems in infant mortality is stillbirths; one and a half times as many as the deaths from all other causes during the first two weeks. Except for the greater part which syphilis plays, the causes of stillbirth are identical to those which produced death during the first days of life. In considering the question of the prevention of infant mortality, two things are especially important. The great number of deaths from congenital weakness can be reduced only by the care of the mother during her pregnancy. The number of actual stillbirths, or deaths from causes connected with parturition, can only be controlled by improvement in obstetric practice.

Care and Feeding of Incubator Babies. Grulee¹ gives his results in the treatment of 8 premature infants under his care in the hospital. These infants were kept in electrically heated incubators. These incubators sometimes have a sudden rise of temperature which should be guarded against, if possible, as it may prove of decided injury. Among these infants there was none whose body temperature was less than 94° F. Of the 8, 1 weighed less than 2 pounds; 3 between 2 and 3; 3 between 3 and 4, and 1, 6 pounds.

The method of care consisted in an oiled bath every day given as quickly as possible in a very warm room and the child immediately returned to the incubator. In extremely small infants the body was covered with cotton held in place with gauze. The larger children had a slip and a small diaper. The infants were not disturbed except to feed them, to give them water, and change the diaper. Feeding was done by gavage, the child being in the incubator with the doors open. The quantity of food depended on the size of the child, and varied from $\frac{1}{2}$ to $1\frac{1}{2}$ and 2 ounces. No one of these infants was fed more often than every four hours, and this the writer believes was the essential element in his success. It was found that they did better when this period was fixed, ceased regurgitating and digested their food well. Attacks of cyanosis were relatively rare in this series, and the four-hour intervals seem to have been of decided success.

Two of the 8 infants were fed artificially with undiluted albumin milk. This was based upon the theory of a negative nitrogen balance in the infant. Colostrum is the first natural food of the infant and this is rich in protein and poor in sugar and fat.

There was one fatal case of an infant born under conditions which made its continued existence impossible.

The Status of the Child in Obstetric Practice. Wall² makes a plea for a more careful obstetric practice in conserving infant life. He calls for especial care in the management of cases of so-called pernicious nausea lest the physician be deceived, and pregnancy be terminated

¹ Surgery, Gynecology and Obstetrics, February, 1915.

² Journal of the American Medical Association, January 22, 1916.

unnecessarily. He urges that in deciding upon obstetric operations that the interest of the child be given the fullest consideration.

The term viability is misleading. He believes that it would be well to abandon the old term viability or to place its meaning at two periods, one the moment of fecundation of the female ovum or two hundred days from that time coincident with the termination of the second stage of labor. Certainly, in the interest of the child, the period of prematurity should be made as short as possible. The writer estimates that in the city of Washington the deaths from prematurity reach 31.54 per 1000 during the first year of life; this is 50 per cent. greater than the group of deaths from intestinal disease during the same period.

During the year 1914, among 1140 infants studied in the city of Washington, there were 11 deaths, 3 from congenital syphilis, and 1 from probable congenital syphilis. This would give a mortality of nearly 40 per cent. of all the infant deaths from syphilis.

The writer also urges the importance of prenatal care of the mother's breasts, and the regulation of her diet in influencing the size of the child.

Birth injuries and palsies obviously result in the greater number of cases from birth pressure, and often through the improper use of instruments. The writer urges the abandonment of the old high forceps operation. He cites the case of a child delivered by Cesarean section, weighing at birth 7 pounds 9 ounces, and perfect in every particular. The first born child of this mother was delivered by high forceps after a tedious labor. The child has at present a large scar on the right forehead involving the bone as well as the soft structures, a depression of the orbital arch, strabismus, and total blindness in the right eye. The contrast between the condition of this child and that born by Cesarean section is very striking. He also cites the well-known example of a monarch, much in the public eye, whose arm was injured during his delivery in breech presentation.

Transfusion by the Citrate Method in a Sixty-hour-old Baby with Melena Neonatorum. Woltmann¹ reports the case of a female infant weighing 8 pounds, delivered by forceps, because rotation of the head failed during labor. Delivery was not especially hard, and the child was not apparently injured. During the first fifty hours the child was irritable and cried. It then passed a small amount of bright blood from the bowels, and three hours later a larger quantity of darker blood, when it was given a subcutaneous injection of normal horse serum. During the next seven hours there were eight or ten bowel movements composed exclusively of dark blood. The child's ears became colorless, the lips and finger nails cyanotic, and breathing was difficult. Through a small incision, the median basilic vein was exposed, and 60 c.c. of citrated

¹ Journal of the American Medical Association, December 18, 1915.

blood injected with a Record syringe and needle. There was an immediate improvement of the color of the ears and lips, respirations were better, and the child slept for the next two hours. During the next few hours, two more bowel movements of dark blood were passed, evidently that remaining in the bowel at the time of transfusion. After this recovery was uneventful.

The blood used in transfusion was prepared by placing in a sterile container 10 c.c. of sterile 2 per cent. sodium citrate solution, and adding to that 100 c.c. of blood removed from the vein in the father's arm with a syringe and needle. The father's veins were small and the needle introduced did not allow the blood to escape rapidly enough, so the syringe was used to hasten the collection of blood, which was immediately mixed with the citrate solution.

The Endowment of Childhood from the Obstetric Stand-point. Moran¹ alludes to the mortality statistics for 1911, published by the Bureau of Census. With an increased death registration area (now 63 per cent. of the total population) there was a decrease in the death of children under one year to 149,322, as against 154,373 in 1910; but those who lived less than a day increased not only relatively but also absolutely, that is, from 14,946 in 1910, to 40,883, or 27.4 per cent., in 1911. These figures show that efforts made to save the lives of infants through pure milk and more intelligent care produced results, but that lack of organized effort has not influenced prenatal conditions nor brought about essential improvement in the average obstetrical practice.

In a review of 10,533 confinements in the obstetric service of the Columbia Hospital, Washington, there were living births 9817; stillbirths, including abortions, 716. This hospital is open to the reputable profession, and all classes of patients are received. More than 60 per cent. are admitted in labor, and over 70 per cent. were negroes. Free patients are discharged on the eighteenth day if they have made an average convalescence.

When the causes of death are tabulated, it is seen that 24 per cent. are put down under the head of unknown, and of the stillbirths nearly 50 per cent. are under this category. The prevalence of syphilis may be inferred from the fact that of 171 Wassermann reactions done in the past four years in the obstetric department 113 were positive, and out of this number 35, or 30+ per cent., had stillbirths. Out of 58 negative reactions, there was only 1 stillbirth. At least 40 per cent. of the unknown stillbirths are caused by syphilis. Causes independent of labor constituted nearly 70 per cent. of the total infant mortality, and these would be largely prevented by proper management and medical treatment. Accidents and complications of labor were responsible for 18 per cent. of the fetal deaths. Here it is difficult to know how many

¹ Journal of the American Medical Association, December 25, 1915.

might have been saved, as these cases were delivered by a considerable number of physicians, all differing in skill and experience.

After confinement, pneumonia and enteritis most often ended the life of the infant, and with the miscellaneous and accident groups, made up 9 per cent. of the total; while hemorrhage in the newborn, malformations, and monsters were 3 per cent.

The Influence of the Present European War upon Obstetrics. The influence of the present European War is seen in the diminished work done in the laboratories and the lessened literary output of the European countries engaged in the conflict. All European journals devoted exclusively to obstetrics and gynecology, and published in the countries at war, are diminished somewhat in size. The *London Journal of Obstetrics and Gynecology of the British Empire*, instead of appearing monthly, appears greatly lessened in size once in several months. The principal obstetric journal of Paris issued a statement that the journal would be continued as regularly as possible, and with a little diminution in size as possible and that has been well maintained. The German journals appear regularly, but reach this country with delay, and are some of them lessened in size, but the literary output of Germany in obstetrics and gynecology has been remarkably well maintained. In all obstetrical journals, some of the articles are by foreigners, and others by the older obstetricians. Especial attention is given to conditions influencing the birth rate and the preservation of infant life. In *Monatsschrift f. Geburtshülfe und Gynäkologie*, 1915, Band xli, Heft 6, there is a review of the conditions prevailing in gynecological clinics of Germany and Austria. As an example, Bumm's Clinic in Berlin shows that, of ten assistants, seven are in the army. The number of students had been greatly diminished and most of them were women. The material for the clinic is somewhat greater than before the war. In the clinic at Erlangen, of the four assistants, three were in the army, and one is acting as surgeon to a lazaretto, and the number of students is greatly diminished. The clinical material has increased, as more women now seek the aid of the clinic, especially for confinement, than before the war. From the Freiburg Clinic almost the entire staff went to the army, and in June, 1915, none had returned to the clinic. It was interesting to note that the number of gynecologic cases showing hypochondria had greatly diminished under the genuine excitement of the war. In Goettingen, the assistant staff at the time of writing were in the field, and women physicians were serving as assistants in the clinic. The number of students had greatly diminished, and the clinical material, especially in obstetrics, had increased. In Heidelberg, the clinic for midwives had been closed, and some of the space given over to the accommodation of convalescent soldiers. Most of the staff were in the army, and the obstetric material had greatly increased, as many married women whose husbands were in the army had come to the clinic for

care. From Keough, the director of the clinic, Prof. Höhne and his staff, were in the army. From Prague a number of the wards had been closed for the usual purposes and reopened for the use of wounded men. Schauta and Wertheim were both actively engaged in the work of their clinics. The number of students had diminished very little, but most of the assistants had gone to the army.

The same is true of all of the belligerent countries, and the staffs of the clinics, if of suitable age and physical strength, have been taken for war and their places largely filled by women physicians.

There have been interesting examples of obstetric practice occurring practically during the war. In one instance, an English army surgeon was asked to go at night just beyond the trenches to a group of Belgian peasants among whom was a woman who had given birth to a child. When the firing ceased at nightfall, the surgeon, taking with him antiseptics, went to the shelter in question and found that the child had been safely born, but that the placenta had not been delivered. Under antiseptic precautions, this was expressed, and the mother made as comfortable as possible. On successive nights the surgeon made several visits to the mother and child, and the Belgians showed their gratitude by bringing such offerings of food as they possessed to the British camp. The fortunes of war shifted combatants, and the mother and child were lost sight of.

On another occasion one of the junior obstetricians from a German clinic serving with the army in Belgium was asked by a Belgian physician to see a woman in labor, in whom spontaneous delivery failed. Examination showed a contracted pelvis, and delivery was safely effected by abdominal section, followed by recovery of mother and child.

One very evident result of the war is the increased interest in obstetrics and in the conservation of infant life. The world seems waking up to the fact that such an enormous loss of human life must be made good, and that human life will no longer be as it has been, the cheapest of all things. In America, this interest is manifest, and it is to be hoped that it will result in better facilities for maternity work and in the endowment of chairs of obstetrics and maternity clinics.

DISEASES OF THE NERVOUS SYSTEM.

By WILLIAM G. SPILLER.

BRAIN TUMOR.

Tumor of the Pineal Gland. A very important monograph on the pineal gland has been written by K. H. Krabbe,¹ but, unfortunately, it is written in a language understood by few Americans. An excellent review of the work has appeared, however, and from this we learn that Krabbe takes a very conservative view. Histological research, he holds, cannot determine whether or not the structure is a gland with an internal secretion, but the best argument in favor of this view is the fact that the pineal cells show numerous amitotic divisions in process, and that there is an excretion of nuclear granules. Ablation experiments have left the functions of the pineal body doubtful, and have not determined any certain connection between the gland and the genital apparatus. The effects of injection of pineal extracts are considered in only eight lines, and are described as interesting but inconclusive. About 70 cases of pineal tumor have been described up to the present time, and in 5 of these premature development of the sexual organs has been noted, and in a few others the patient has shown obesity. Marburg at first attributed the premature sexual development to hypopinealism, the obesity to hyperpinealism; but more recently he and some Italian investigators have concluded that the pineal body is an organ with an internal secretion that regulates the development of the secondary sexual characteristics. It is important to know that Krabbe after reviewing the literature deprecates hasty speculation as to the function of the normal pineal body based on the few exceptional pathological cases, and he thinks that the only justifiable conclusion is that the effects of pineal tumors may exhibit analogies with those of tumors of other organs with internal secretions. He believes the pineal body may regulate and keep constant the pressure of the cerebrospinal fluid secreted by the ependyma of the choroid plexuses. He does not think it can be described as a rudimentary organ, or as degenerating or functionless, or even in a state of involution.

Pituitary Tumor. Cushing and Walker² have found that perimetric distortions are wanting in nearly half of the examples of hypophysial disease in the stage at which they are commonly recognized today, and that in about 20 per cent. of the patients showing characteristic

¹ Review in the *Review of Neurology and Psychiatry*, June, 1915, p. 300.

² *Brain*, 1915, vol. xxxvii, p. 341.

neighborhood symptoms there occurs no perimetric change demonstrable by our present methods. The chiasm is therefore capable of considerable distortion by a growth in the interpeduncular space without a demonstrable encroachment upon the fields of vision. In a few of their cases, supposedly normal fields were taken shortly before death, and yet at the necropsy the chiasm was found to be greatly deformed and elongated. It is well known that a chiasmal lesion does not always cause bitemporal hemianopsia, even when chiasmal symptoms are present, and Cushing and Walker have found that nearly half as many cases have shown a definite homonymous hemianopsia or a tendency to it. They emphasize the fact that absence of any defect in the fields does not necessarily speak against a primary pituitary or interpeduncular growth. The important feature of the field deformations due to chiasmal lesion is their progressive involvement of the fields for color, as well as those for form, and the associated alterations in central vision (acuity and scotomata).

Twenty-six of their patients had bitemporal hemianopsia. Seven showed acromegalic changes, and 19 primary hypophysial insufficiency. In 4 patients a characteristic bilateral temporal hemianopsia was present with fairly vertical meridian; in 9 cases there were fairly symmetrical defects in the temporal fields, but the stage of a vertical meridian was not yet reached or had been passed by. In another 9 patients a tendency toward a bitemporal field constriction was evident, but the field defects were very asymmetrical on the two sides.

In 12 cases of homonymous hemianopsia, 4 were acromegalics; in 3 the defect was typical, with a vertical meridian separating the blind from the seeing retinae.

These authors have found that demonstrable perimetric defects are more an evidence of a physiological block than of an anatomical destruction of the nerves in view of the great degree of recoverability in the transmission of light impulses on the release of the nerves from pressure. No correspondence has been found to exist between sharply cut quadrantal or hemianopic field defects and patches of degeneration seen on cross-section of the optic nerves, for they have found that clean-cut functional defects in the fields may occur without any equally clear-cut fascicular disposition of degenerated fibers in the nerves.

In 454 cases, regarded as examples of brain tumor by Cushing and Walker, the lesion in 101 was of hypophysial or parahypophysial origin, and in 81 of these cases chiasmal involvement led to deformations in the fields of vision. In the majority of cases, whether of intra- or suprasellar tumor, the first perimetric indication of the process is shown by a slant in the boundary of the upper temporal form field and a corresponding quadrantal defect in the color peripheries. When relief of pressure has been afforded by operative measures, the recession of the defects takes place in a sequence, the reverse of that characterizing

the stages of an advancing process. Primary optic atrophy often does not represent an actual anatomical degeneration so much as a physiological block to the transmission of visual impulses.

They advise detailed perimetry with small test objects of serial sizes, particular attention being paid to the shading off of the upper temporal peripheries and to the presence of relative paracentral scotomata in the same quadrant, for patients with pituitary disease, in order that stages of hemianopsia antecedent to those usually recognized may be detected.

Intracranial Telangiectasis. That intracranial telangiectasis may be a cause of Jacksonian epilepsy is shown in an interesting paper from the pen of Ernest Sachs.¹ In one case he found, on opening the dura, a huge bluish mass of vessels, so dense in places that the underlying cortex could not be seen. The mass lay over the motor area. There were no branches connecting with the dural vessels. Death resulted from the attempt to remove this angiomatous mass.

In a second case an angiomatous process was found in the dura, having numerous connections with the pial vessels, shown when the dura was reflected. This area of increased vascularity lay over the lower part of the motor area. All the vessels connecting with the pial vessels were ligated and the dural mass ligated above and below, then the dura was closed. The patient had a violent convulsion two days after the operation, but since has been well, although the time has not been sufficiently long to judge concerning cure. Cases resembling these two are rare in literature.

E. Sachs makes a distinction between telangiectasis and angioma; the former is a congenital dilation of capillaries; the latter is a new growth and only properly so called when new bloodvessels are formed. Some reports of angioma are therefore incorrect. If the process is a new growth, extirpation is the procedure indicated, while if it is a telangiectasis, ligation should suffice. The ligation should be planned so that the vessels do not remain filled with blood, they will then atrophy and do no harm.

Papilledema in Brain Hemorrhage. Ayer² takes Oppenheim's statement that he has only once found choked disk in chronic recurrent hemorrhage of the brain as justification for reporting 2 cases in which there was not only choked disk, but other evidence of increased intracranial pressure, so closely simulating brain tumor that operation was performed in each case. In one case a "shock" occurred about a year previously, following which the man remained generally weak, though not paralyzed, complaining of dizziness and headache. Examination suggested moderate increase of intracranial pressure, with suspicion of tumor in the cerebellopontine angle, on account of deafness, marked

¹ American Journal of the Medical Sciences, October, 1915, p. 565.

² Journal of Nervous and Mental Disease, May, 1916, p. 443.

cerebellar ataxia, speech disturbance and a questionable Babinski on the right. The eye-grounds showed moderate papilledema, and nephritis was diagnosed. Two months later he died suddenly, and a large hemorrhage of the brain was found. The brain contained many other hemorrhages of different sizes, and at least five ages of hemorrhage were suggested by the difference in color. Chronic interstitial nephritis also was present. One may justly ask why, in this case, the papilledema was not attributed to the nephritis rather than the brain hemorrhage.

The second case is hardly more conclusive than the first, and one can hardly accept these cases as demonstrating that a high degree of papilledema may result from hemorrhage of the brain.

Cerebral Hemorrhage in Newborn Children. In the 3 cases of this disorder reported by John Phillips¹ the late appearance of the symptoms suggested that the hemorrhage was not due to trauma at birth, but that its occurrence was coincident with the appearance of the symptoms. Phillips believed that the cause in all probability was similar to that in other cases of hemorrhagic conditions of the newborn, such as the hemorrhages from stomach and bowel, and in reality the condition was due to a defect in the blood itself or the vessel wall. In one of his cases there was bleeding from the bowel into the scrotum, and in another there was some bleeding from the vagina. Hemorrhage, the author thinks, might be prevented by the administration of serum, which should be given with the slightest bleeding from the bowels, stomach, vagina or other parts. Operation should be attempted in all cases of brain hemorrhage, in Phillips's opinion, because, if the child survives and the clot be not removed, mental or physical defects will result. In view of the occurrence of hemorrhage from mucous membranes in association with intracranial hemorrhage, it would be advisable to administer horse serum or do a blood transfusion as well. A few other cases of hemorrhage elsewhere than in the brain in babies are reported by Phillips. He believes that one of the most striking advances in treatment in recent years is the serum treatment of the hemorrhagic disease of newborn infants. The cases respond quickly to the administration of serum or to injections into the buttocks of the infant of fresh blood drawn from a vein of the mother. Some cases that do not respond to these measures are cured by direct transfusion of blood. Where whole blood is used, from 10 to 30 c.c. are injected subcutaneously every four hours as long as the hemorrhage continues.

Conjugate Oscillation of the Eyes. This seems to be a new sign with an apoplectic stroke, and is reported by Sklodowski.² In a case of recent hemiplegia observed by him, both eyes kept up continuous coördinated movements to the left and right. The movements were slow and rhythmical and numbered sixteen to the minute, first to one side,

¹ Cleveland Medical Journal, August, 1915.

² Zeitschrift f. d. g. Neurologie und Psychiatrie, vol. xxxi, Nos. 1, 2 and 3, p. 166.

then to the other. The excursion was so pronounced that in the lateral position the edge of the cornea reached the canthus of the eye. These movements lasted more than forty-eight hours, until the death of the patient. The necropsy revealed a focus of softening in the right lower parietal lobe, the posterior part of the two upper temporal convolutions and the adjoining portion of the occipital lobe. Sklodowski is unable to give a satisfactory explanation for these peculiar movements, and no exactly similar case seems to have been reported, even under the designation of nystagmus. He concludes that irritation of the subcortical region beneath the lesion caused movement of the eyes to the opposite direction, and, after the active period, exhaustion, as a result of this irritation, occurred; then the centre for ocular movements in the other cerebral hemisphere gained the ascendancy. This explanation sounds a trifle forced for such rhythmical movements of the same amplitude in each direction as he describes.

Lesion of the Superior Longitudinal Sinus. The study of injuries of the superior longitudinal sinus by Holmes and Sargent¹ enriches greatly our knowledge of cerebral venous lesions. They found that the extent of the palsy varies according to the site, severity, and extent of the lesion. They have notes of 20 cases in which all limbs were affected; of 31 in which both legs and one arm were weak, of 16 in which only the lower limbs were affected, of 6 in which the symptoms were mainly hemiplegic, and of 5 in which one leg alone presented any palsy. The distribution of the paralysis and its relative severity in different segments of the limbs differs from that of the usual cerebral palsies. When the upper limbs are affected the finger movements either escape, or are weak for only a short time after the injury, and rapidly recover and regain their normal power. The hand movements never remain weak long except when the sinus lesion is complicated by an independent injury of the brain. The wrist movements, and especially those of the elbows, are affected more severely and recover less rapidly, while those of the shoulder often are disturbed when the more distal segments of the limbs escape, and recover much less quickly when the whole limb has been involved.

In that the proximal segments of the upper limbs are most paralyzed and the weakness diminishes distalward, the paralysis contrasts strongly with that seen in ordinary hemiplegia, in which the distal segments are more severely affected. A definite paresis of the face or tongue is extremely uncommon, and is at the most transient, while speech is never affected in pure sinus lesions. The trunk muscles, especially those of the back, may be affected, and the patient is then unable to sit up and often cannot roll over in bed. The distal movements in the lower limbs are most affected.

¹ British Medical Journal, October 2, 1915, p. 493.

I would suggest that the easiest way to remember the location of the motor segments in the cortex is to consider them from above downward as representing an inverted man with the upper limbs extended above the head; we thus have the representation of the toes highest in the cortex, and then follow the centre for ankle, knee, hip, trunk, shoulder, elbow, wrist, fingers and face. Having this representation in mind we can understand the symptoms produced by lesion of the superior longitudinal sinus.

The distribution of the lateral cerebral veins and the amount and freedom of the anastomosis between the superior and inferior systems apparently vary greatly, and this influences the extent of the paralysis.

Rigidity is generally coextensive with the paralysis and closely related to it in its degree. It is always most pronounced in the lower limbs, and, when the upper limbs are involved, it is greater at the shoulder than at the elbow, and is rarely present and never pronounced in the wrist and fingers. It may be pronounced within twenty-four hours of the infliction of the injury, and usually diminishes as power returns. There seems to be very little tendency to contracture.

An interesting observation made by these writers is that when the sense of position and the appreciation of passive movement are suddenly completely abolished in a limb, aimless involuntary movements of the limb may occur, and, from the description given of the movements resulting from lesions of both parietal lobes, they seem to resemble those occurring in myelitis or tabes.

Experience has shown that the results of surgical intervention have been extremely unsatisfactory. In 39 cases with operation, death occurred in 15 in the base hospitals, while only in 1 of the 37 unoperated cases death occurred before transference to England. These figures have not an absolute value but they are sufficient to emphasize the danger of operation.

Recovery of Motor Function in Long-standing Hemiplegia. Franz, Sheetz and Wilson¹ believe mechanical treatment may be of much service in old hemiplegia. They have employed massage and vibration, and effleurage or stroking for muscles strongly contracted. The hand of the patient was grasped and the limb shaken or vibrated until there had been a distinct loosening of the muscles. The extensors were also percussed (tapotement) to give them the benefit of the mechanical stimulation, and the nerves of the arm were also stimulated by deep pressure. All kinds of movements of the arm were also produced passively, when possible. The results obtained with 5 patients show clearly the possibility of a return of function in a paralyzed limb, and these authors believe that at present there is no indication of a limita-

¹ Journal of the American Medical Association, December 18, 1915, p. 2150.

tion of the quantity of improvement which may be attained by suitable and sufficiently prolonged therapeutic measures.

Preservation of Automatic Movement with Loss of Voluntary Movement from Cortical Lesion. A curious case reported by Marie and Athanassio-Bénisty¹ is one in which, following a bullet wound of the head, spastic paraplegia of the lower limbs developed, and, although the slightest voluntary movement of the toes or foot was impossible, the man in walking contracted all the muscles of the foot. These authors are in doubt whether this paralysis should be regarded as hysterical or whether the muscular contractions during walking should be regarded as automatic and spinal, and therefore independent of volition.

In the report of another very similar case by Marie and Think² the statement is made positively that the phenomenon is a manifestation of spinal automatism. These are very interesting observations.

Occlusion of Cerebral Arteries in Diphtheria. An extraordinary case has been observed by Rolleston and Gunson.³ A girl, aged eight years, had an attack of severe faucial and nasal diphtheria. On the seventeenth day of the disease she suddenly retched, she became cyanosed, the respirations were rapid, and a convulsive movement of the right arm and leg, with loss of consciousness, ensued. Cheyne-Stokes breathing rapidly developed. Ankle-clonus and extensor response were present on both sides. The temperature rose gradually to 103° F. and death resulted. The necropsy showed a clot entirely filling the basilar artery, and to a greater or less extent occluding all the arteries entering into the formation of the circle of Willis, *viz.*, the posterior cerebral, posterior communicating, internal carotid, middle cerebral, and anterior cerebral arteries, and the occlusion was much more marked on the right than on the left side.

As these authors state, occlusion of cerebral arteries in diphtheria in all previously reported cases has been associated with hemiplegia, and is usually the result of embolism. An analysis of 80 cases of diphtheritic hemiplegia by Rolleston showed that out of 18 in which a necropsy had been held, embolism had been found in 13, thrombosis in 3, hemorrhage in 1, and sclerotic atrophy in 1. In the case abstracted above the enlargement of the heart noticed during life, the existence of an antemortem clot found at the necropsy, and the presence of an infarct elsewhere are in favor of embolism. The extensive nature of the clot made it probable that a small primary embolus was followed by more considerable local thrombosis. The signs of complete occlusion of the basilar artery were present in this case, *viz.*, bilateral paralysis, rigidity and spasm, sudden rise of temperature, and bulbar symptoms, especially vomiting, Cheyne-Stokes breathing, and tachycardia.

¹ *Revue Neurologique*, May and June, 1915, p. 393.

² *Idem.*, p. 407.

³ *Review of Neurology and Psychiatry*, August, 1915, p. 373.

Reflexes in Diphtheria. Gunson¹ has found a crossed reflex of the following nature in 76 per cent. of cases of diphtheria: on stimulating the quadriceps femoris muscle mass a reflex movement of flexion at the hip-joint and extension of the great toe of the contralateral limb resulted, and was accompanied by pain, referred to the site of stimulation. In half the cases the reflex was incomplete, and consisted only of extension of the great toe. This reflex he believed pointed to involvement of the spinal cord in a larger proportion of cases than is generally recognized, and it suggests that the motor weakness, ataxia, and loss of patellar reflexes may be largely dependent upon a central lesion of a toxic or inflammatory nature.

Subacute Hemorrhagic Poliencephalitis of Wernicke. Fortunately this is a rare disease and it is important to know that it may occur with the symptom-complex of a lesion of the nucleus ruber, as in a case studied by Egas Moniz.² The symptoms began with bilateral ptosis which became complete; headache was slight, but delirium soon occurred. The man had then complete paralysis of the third and fourth nerves of each side, slight nystagmus in extreme positions of the eyeballs, tendency to fall to the left while walking, marked ataxia of the left hand but not of the right, some ataxia of the left lower limb, and adiadochokinesis of the left hand, but not of the right. Improvement occurred, but for two months until the report was made he had complete paralysis of the right third and fourth nerves, unequal pupils with mydriasis of the right pupil, without reflex movement, and slow pupillary reaction on the left side.

The ocular signs indicated poliencephalitis superior, *i. e.*, a lesion implicating the nuclei of ocular nerves, and alcoholism, considered a cause of this condition, could be excluded. The course in this case was abnormal in that the development was subacute and progressive, and two months were required for the maximum degree of symptoms. The persistence of the ocular palsy on the right side with left hemi-ataxia, left hemiasynergia and left lateropulsion indicated that the lesion had extended from the nuclei of the right third and fourth nerves to the right nucleus ruber. This is an important symptom-complex and may be caused by occlusion of the small arteries supplying the centre of the cerebral peduncles. The nystagmus is attributed to implication of the posterior longitudinal bundle.

Alcoholic Wet Brain. According to Sceleth and Beifeld³ only the most cursory mention of alcoholic wet brain is made in the literature upon the complications of alcoholism, with the exception of the writings of Dana and Lambert. The condition always follows, never precedes, delirium tremens, but the latter does not always end in cerebral edema.

¹ Review of Neurology and Psychiatry, July, 1915, p. 317.

² Revue Neurologique, April, 1915, No. 16, p. 237.

³ American Journal of the Medical Sciences, June, 1915, p. 881.

After long-continued overindulgence in alcohol, an individual is liable to develop delirium tremens, for reasons as yet unknown. This usually is manifested in three stages: incipient, fully developed (classic), and comatose (wet brain). The symptoms of wet brain are essentially meningeal, semicoma, generalized hyperesthesia, and muscular rigidity (Kernig's sign and rigidity of neck) standing out prominently; the more marked are the latter two features, the graver the prognosis. The cerebrospinal fluid is, to all appearances, normal. The mortality is nearly 75 per cent. Necropsy reveals no gross lesions aside from the more or less marked fluid accumulation in the pia arachnoid space, a widening of the sulci, and a narrowing of the convolutions to account for the symptoms of changes in the brain. Bronchopneumonia is often associated with the cerebral edema complex, and this obscures the diagnosis and usually is the cause of death. The differential diagnosis must be made from fracture of the skull and fracture may easily be obscured by the nervous manifestations of comatose delirium tremens. Basal fracture may be indicated by delayed ecchymoses over the mastoid and about the orbit, ocular palsies, paresis of one or more limbs, and blood in the spinal fluid.

Motor Dyspraxia. The term motor dyspraxia, as defined by Wilson, is "the difficulty in performing certain subjectively purposive movements, or movement complexes, with conservation of motility, of sensation, and of coördination." Fearnside,¹ in writing on this subject, says that although the manifestations which are included under this term are found frequently in cases of hemiplegia, aphasia and other cerebral disorders, the number of cases which have been fully investigated both clinically and pathologically is still small. Usually the motor dyspraxia has been one only of a series of manifestations, and at necropsy multiple lesions have usually been found. Liepmann has stated that the region which is most frequently affected in well-developed apraxia is the left parietal region, and this statement he made after a study of 26 cases of his own and of the whole of the literature on apraxia. Kleist found that especially the supramarginal convolution was affected.

In Fearnside's case the clinical signs were limited to motor dyspraxia, dysgraphia, paraphasia, and amnesic aphasia, and at the necropsy a small, well-localized, secondary carcinomatous nodule was found in the left supramarginal convolution, surrounded by recent cerebral softening. Nowhere in the literature could he find any record of a case where a well-localized neoplasm, either primary or secondary, had given rise to motor dyspraxia and paraphasia.

The dyspraxia was shown when the man was told to put his left hand on his right ear. He first put his left hand to his left ear, and then put

¹ Brain, 1915, vol. xxxvii, p. 418.

his right hand to his right ear. When told to make a fist with the left hand, he made a fist with both hands. Many movements he was directed to make he performed well, but others he was unable to do.

Loss of Mental Vision. Only a few cases of loss of mental vision have been published, but Gilbert Ballet¹ believed that if one were to search for this symptom in all psychasthenic states or disturbances of the personality he would find it frequently. The condition was recognized by Charcot and a case was reported by him in 1883. Ballet's patient complained only that she was unable to make a mental picture, a visual representation, of her husband and children or of anyone else. She could describe various features of these persons, or of places, but she was unable to picture places. She knew that the French flag had three colors, but she could not picture the flag in mental vision. The same disturbance occurred in her dreams, but she had no difficulty in recognizing persons and places when they were actually before her. She could find her way about Paris. Persons afflicted in this way are psychasthenics, they are hesitators, doubters, and have difficulty in accomplishing their mental acts.

Hydrocephalus and Syphilis. In my digest of last year I spoke of the views entertained concerning congenital syphilis as a common cause of chronic hydrocephalus, and a brief abstract now from an Italian journal directs attention again to this subject. De Stefano² obtained a positive Wassermann reaction in 33 out of 35 cases of chronic hydrocephalus, but antisiphilitic treatment produced little improvement.

Soft Eyeball in Diabetic Coma. The diminished tension of the eyeball occurring in diabetic coma has been brought to notice by Riesman,³ and he has made an interesting study of the literature on the subject. The condition was first described by Krause in 1903. He did not observe it in simple diabetes or in cases of acidosis unassociated with coma. Careful observations were made by Lea Gite Schütz. She found that the tension varied from day to day, but that at the height of the coma it was extremely low or even *nil*. The soft eyeball in diabetic coma, Riesman says, is not due to blood-pressure changes; it is also not an agonal phenomenon, for it is not present in persons dying from other causes. Whether the ketone bodies play a part in its production is not definitely established. In acidosis without coma the symptom is not present. As in acidosis with coma the acetone bodies probably are retained in large quantities, they may have a share in the production of the soft eyeball. In one of Riesman's cases of diabetic coma, in which ketone bodies were not found in the urine at any time, the soft eyeball was not present. He has searched for this peculiar change in tension in 3 cases of diabetic coma and found it in 2.

¹ *Revue Neurologique*, July, 1915, p. 554.

² Abstract in the *Journal of the American Medical Association*, October 2, 1915, p. 1224.

³ *Journal of the American Medical Association*, January 8, 1916, p. 85.

Cortical Visual Representation. In 1886 Byrom Bramwell¹ observed a case in which there was complete loss of peripheral vision with very marked reduction of macular vision. He diagnosed the condition as probably caused by a bilateral lesion of the occipital lobes in the region of the half-vision centre. The case did not appear to be one of the rare cases of double homonymous hemianopsia, in which successive lesions of the occipital lobes produced the condition, but there was a *simultaneous* bilateral lesion in the right and left occipital lobes, a rare, if not unique, condition. The man died in 1910, twenty-four years after he was first observed by Bramwell, and he was seen by him every six months during this period. The condition remained unchanged during these twenty-four years, for although central (macular) vision improved slightly, peripheral vision remained completely obliterated. At the necropsy a large lesion was found in each occipital lobe, and although the lesion was of great extent in both occipital lobes and the severance of the connections between the visuosensory centre and the other parts of the brain was extensive, there was no mind-blindness. The microscopic examination was made by J. Shaw Bolton. The brain lesion consisted of extensive destruction of the white matter and part of the cortex of the left occipital lobe, and very extensive destruction of the white and gray matter of the right occipital lobe. The lesions apparently were the result of old softenings, probably from the sudden onset, embolic in origin, and the calcarine cortex was normal in both hemispheres. It would seem, therefore, from this case that macular vision as distinct from panoramic vision is represented in the calcarine cortex, and that panoramic vision is represented in the surrounding and remaining visuosensory cortex.

Associated Movements are not very uncommon when affecting one side only, but when affecting both sides nearly equally, as in a case reported by Cadwalader,² they are very rare. This patient said he had been weak in the left arm and leg as long as he could remember, and the hemiparesis probably existed since birth. Voluntary movements of the muscles of the lower part of the face were equally impaired on each side; and muscular contraction on one side seemed to cause a similar movement on the opposite side of the face. Strictly unilateral voluntary movement of the lower facial muscles could not be performed. The muscles of the upper part of the face were not affected. With each movement of the left paretic hand a similar movement was performed at the same time with the right hand; and with each voluntary movement of the right non-paralyzed hand a similar movement was performed at the same time with the left hand, but on account of partial paralysis the muscular contractions of the left hand could not be so perfectly performed as they were with the right hand. Unilateral volun-

¹ Brain, 1915, vol. xxxviii, p. 4.

² Journal of Nervous and Mental Disease, March, 1916, p. 259.

tary movement was impossible. The same phenomena were observed in the feet and toes, though to a much less degree. It seemed as though the motor tract from the sound side of the brain innervated more nearly equal both sides of the body.

Meningitis. The study of the sugar content of the blood and cerebro-spinal fluid promises to be of diagnostic importance in meningitis and some other diseases. A. H. Hopkins¹ concludes that:

The consensus of opinion, based on recent literature, is that glucose is the principal reducing substance in the spinal fluid. Its concentration in health is slightly lower than that of the blood sugar, as shown by his studies.

In meningitis there is the greatest disturbance in this relationship, there being a pronounced hyperglycemia associated with just as pronounced a drop in the sugar content of the fluid, this drop being due evidently to the destructive activity of the invading microorganisms. It may be possible that the hyperglycemia in meningitis is accompanied by an initial increase in the sugar content of the spinal fluid and that this latter increase is more than offset by the destructive activity of the organisms present.

In diabetes the sugar content of the spinal fluid is almost as high as that of the blood. In infections such as pneumonia there may be a hyperglycemia without apparent change in the spinal fluid. The reducing substance of the fluid is frequently increased in uremia, a condition in which hyperglycemia also occurs:

A slight increase in the sugar concentration of both the blood and spinal fluid occurs in some cases of epilepsy, as it does in certain other nervous conditions, but the cases observed by Hopkins are inadequate for satisfactory conclusions.

Syphilis frequently reveals lower figures than any other condition, with the exception of meningitis.

Circumscribed Purulent Leptomeningitis Due to Frontal Sinusitis. Leopold,² in reporting 2 cases of this kind with necropsy, states that the symptoms of the meningitis frequently are preceded weeks, or even months, by nasal catarrh, with frontal headache; or they may occur after only a few days, following an attack of influenza. The edema and discoloration of the eyelid, with tenderness over the orbit, frequently precede the cerebral symptoms when disease of the wall of the sinus or orbit is present. The frontal headache is present in nearly all cases, though pain in the head is not limited to that region. The pulse and temperature are not characteristic. Rigidity of the neck and Kernig's sign are not frequent symptoms. Paralytic symptoms are noted, usually in a later stage of the disease. Irritability and restlessness, alternating with clouding of the sensorium, are sometimes the

¹ American Journal of the Medical Sciences, December, 1915, p. 847.

² Journal of the American Medical Association, May 27, 1916, p. 1676.

only meningitic symptoms present; and death sometimes comes before the development of paralytic symptoms.

Only a few cases are reported in which operation led to recovery. One of the earliest of these, and possibly the earliest, was that reported by Spiller, Shields and Martin, in 1908. This child developed unilateral paralysis and the brain was exposed promptly and was found to be covered with pus over the motor region. Complete recovery except the occasional occurrence of convulsions, followed this operation. A few similar cases have been recorded since the report of the above case was published. The relief of pressure probably is the chief factor in the favorable result following operation.

STREPTOCOCCUS MENINGITIS WITH RECOVERY AFTER OPERATION. The success which Leighton and Pringle¹ had in operating on 2 cases of purulent meningitis caused by the streptococcus they attribute to the early diagnosis and prompt treatment. Lumbar decompression was done by removing the posterior parts of the third and fourth lumbar vertebræ, incising the dura, and leaving a drain in the wound. Purulent meningitis is usually fatal and death is caused by increased intracranial tension and toxemia. The tension can be diminished by repeated lumbar punctures or permanent drainage. The toxemia these authors believe may be lessened possibly by the dilution of the toxins through the rapid secretion of the cerebrospinal fluid. It is estimated that the normal secretion is replaced every three or four hours by an entirely new supply, and in abnormal conditions, as fracture or lumbar puncture, the alteration in normal tension may result in a very rapid increase in the amount of this secretion. Streptococcus meningitis they believe is a surgical disease, just as acute purulent peritonitis is a surgical one, and early operation and permanent drainage probably will give a lessened mortality in acute purulent meningitis.

EPIDEMIC CEREBROSPINAL MENINGITIS. This disease has been severely epidemic in the British Islands recently, and has shown a low case incidence, a wide-spread but capricious distribution, a predilection for soldiers, especially young soldiers, a high case-mortality, and a rapid disappearance with the approach of fine weather. An important discussion on the subject has recently occurred. Osler² says soldiers have been the chief sufferers. In the first year of the war there were, in the home army, 462 deaths, which put cerebrospinal fever second on the list among the causes of death from acute infection; probably a very much larger number than among the civil population. As a meningitis, he says, it has the unique and fortunate distinction of being the only variety from which recovery takes place in from 50 to 70 per cent. of the cases. Many men of long and rich clinical experience have never

¹ Journal of the American Medical Association, June 19, 1915, p. 2054.

² Proceedings of the Royal Society of Medicine, Therapeutic and Pharmacological Section, October 19, 1915.

seen recovery in the tuberculous, pneumococcic, or streptococcic varieties. The meningococcus of the epidemic form like Eberth's bacillus has "strains" not yet worked out satisfactorily, and the existence of which has not been sufficiently considered.

The epidemic, Osler says, is in the carrier, the meningitis is an incident. The germ is ubiquitous, harbored by many who are not ill and who never have any symptoms; it produces in some a mild catarrh, and in only a few cases reaches the meninges. This also is what happens in pneumonia, in which the proportion of cases to carriers is even smaller than in cerebrospinal fever. The preventive means are guarding against overfatigue, reducing to a minimum the circumstances which favor nasopharyngeal catarrh, and care for good ventilation.

The use of a specific serum, Osler says, is based on sound experimental data, but he must confess to disappointment in many quarters with the serum treatment. In one local outbreak in England, there were 40 cases with 26 deaths, a mortality of 63 per cent. The sera used were from Burroughs, Wellcome & Co., the Lister Institute, Mulford, and Parke, Davis & Co. A little benefit was observed from the use of Mulford's serum and no benefit from any other serum, and yet the treatment had been in the hands of an expert, thoroughly familiar with the technic. In other places the results were equally bad. The sera must have been inert, the strain or strains causing the meningitis were "fast" to the sera employed. It is not known in how many cases the parameningococcus was present.

Gardner Robb, who has had much experience in the use of the specific serum, collected specimen cultures of the organism from cases in various places and took them to the Rockefeller Institute for comparison with those used there. They showed no marked differences. He mentions that for two or three years there had been little use for the serum, then suddenly a great demand came from England, and the available horses were bled as frequently as possible, and the immunity value of the serum dropped seriously. Much of the serum which had reached England was of a lower standard of value, and therein lay the true reason for the disappointing results. He advises general anesthesia in giving the serum treatment, unless the patient is unconscious.

Rolleston found that soamin appeared to give good results injected intramuscularly.

Josephine B. Neal,¹ of the New York Department of Health, states that the two most common mistakes in serum treatment of epidemic cerebrospinal meningitis are giving too few doses of serum if the patient improves considerably after the first one or two injections, and failure to persist with the serum if the improvement is very slow. It has been the experience of the meningitis department during the past five years,

¹ Journal of the American Medical Association, March 18, 1915, p. 862.

that it is rarely safe to give less than four doses of serum on consecutive days, even if the improvement clinically is very rapid and the organisms disappear from the fluid after one or two injections. In cases which have been running on some time, and in which the patients are evidently improving when first seen, one or two injections of serum are sometimes sufficient. Occasionally in a case seen very early and clearing up quickly, only three injections may be given. A case of average severity usually requires from four to seven injections. It is safer to give the injections on consecutive days until it seems evident that the patient is out of danger, than to skip a day or two when a slight improvement occurs, thereby giving the organism a chance to increase. Puncture for the relief of pressure may have to be done several times during convalescence. In a small percentage of cases—from 5 to 10 per cent.—a large number of injections may be necessary before the termination of the case. The serum treatment should be continued until the fluid has been sterile for two or three days and until the patient clinically is much improved. Hexamethylenamin certainly tends to prevent cystitis if retention develops, as it often does.

Aural Vertigo. Vertigo occurring suddenly in attacks and associated with giving way of the legs occurred in a man observed by Munch and Borel.¹ He was of emotional character, and the attacks occurred only when he was on a ladder engaged in painting. The development of deafness later in the right ear suggested an examination of the ear, and a piece of cotton and wax were removed from this ear with complete disappearance of all symptoms. The emotional character of the man probably increased the disorder, but so prompt a recovery following so simple a treatment is unusual.

Syphilitic Diseases of the Nervous System. In an examination of the pathological material of 53 cases, including tabes, taboparesis, general paralysis of the insane, and cerebral syphilis in my laboratory, Auer² was impressed by the similarity of the pictures. In all, as he says, one finds to a greater or less extent an infiltration of the meninges and the sheaths of the smaller vessels of the central nervous system by mononuclear lymphocytes and plasma cells, and further, this infiltration in general paresis does not confine itself to the vessel sheaths or in cerebral syphilis to the surface of the central nervous system. In considering the degree of the degeneration of nerve cells, one must realize that he is dealing with a variable quantity and not too freely describe diminution or loss of nerve cells. Of the chromophilic granular changes of the cells, one frequently finds most pronounced focal changes in general paralysis, and not infrequently severe symptomatic evidence of general paralysis and cerebral syphilis, with little or no changes in the granular cellular arrangement. A disturbance of cortical lamel-

¹ *Revue Neurologique*, July 30, 1914, p. 127.

² *American Journal of the Medical Sciences*, September, 1915, p. 359.

lation is seen only in severe advanced cases and consequently cannot be pathognomonic. In considering a loss of the tangential fibers and glial overgrowth one is again dealing with the relative. Not uncommonly in either general paralysis or cerebral syphilis there is a pronounced lack of correlation between the symptomatic and microscopic findings. Auer thinks it may be possible that the explanation why some alienists can so readily diagnose between general paralysis and cerebral syphilis may lie in the fact that patients with early or intermediate states rarely find admission to insane hospitals, and their experience has been gained chiefly from advanced types.

LABORATORY FINDINGS IN SYPHILIS. The conclusions of Darling and Newcomb¹ regarding serological findings are:

A positive blood Wassermann seems to be the rule in paresis, but even repeated negative findings do not exclude a diagnosis of paresis.

The blood Wassermann may or may not be positive in cerebrospinal syphilis.

The Wassermann reaction was positive in the spinal fluid of all their cases of paresis and cerebrospinal syphilis.

The globulin reaction was very inconstant in both conditions and of no aid in the differential diagnosis.

The cell count varied greatly in both conditions, but was as great in one as in the other.

Five of their cases of cerebrospinal syphilis with uniformly positive Wassermann in the spinal fluids, 2 with positive and 3 with negative blood, show clearly the difficulty in diagnosis by laboratory methods alone.

Satisfactory diagnosis can only be made when the clinical and laboratory findings are considered together.

PLEOCYTOSIS IN SYPHILIS. The diagnosis between cerebrospinal syphilis and paresis cannot be made from the pleocytosis of the cerebrospinal fluid. Solomon and Koefod² have studied this question and their investigations lead them to conclude that:

1. The number of cells found in the fluid of untreated cases of syphilitic disease of the nervous system offers no definite information of prognostic value.

2. One is not justified in drawing any conclusions as to whether a case is one of cerebrospinal syphilis or one of paresis, nor the time the process has been active, nor the severity of it, from the cell count.

3. The cell count may vary greatly from month to month, or when the interval is but several days, while at other times it may remain very nearly the same after an interval of months.

4. Cases showing natural remissions may show no reduction in the cell count, or other spinal-fluid findings.

¹ American Journal of Insanity, January, 1916, p. 449.

² Boston Medical and Surgical Journal, December 30, 1915, p. 996.

5. Cases treated with salvarsan either intraspinaly or intravenously tend to show a more or less rapid fall in the cell count. This count will as a rule remain low during treatment, but is likely to rise when treatment has been discontinued, but may rise during treatment after having first fallen.

6. Cases may show remissions during treatment and still have a pleocytosis.

7. Treated cases having the cell count fall to normal may at the same time become very much worse and develop more marked paralytic symptoms.

8. In general paralysis the cell count in no way parallels the other spinal-fluid findings.

9. In cases in which the other tests show an improvement, for instance in cerebrospinal syphilis, the cell count also readily and early drops to normal. At times it may drop to normal before other spinal fluid tests become negative; again it may be the last to reach normal.

10. The change in cell count seen in untreated syphilitic disease, is also found in non-syphilitic disease, as brain tumor.

11. The cell count offers nothing of prognostic importance in syphilis of the nervous system, unless accompanied by improvement of the other laboratory signs.

12. The cell count is not an index to the predominance of irritative or degenerative changes.

Edel and Piotrowski,¹ after reviewing the literature, reach the conclusion that the positive Wassermann reaction in the spinal fluid with *small* amounts of fluid is an evidence of paresis in a suspected case. Large amounts of fluid are not so reliable. The three remaining reactions (Nonne-Apelt test, lymphocytosis, Wassermann of the blood) are not necessary for a diagnosis of paresis. In the early stages of paresis the somatic and psychical symptoms of this disease may be absent or slight, and in these cases a positive Wassermann of the fluid with 0.1 to 0.2 c.c. of spinal fluid is of great value. They find that in very early paresis a history of syphilis often cannot be obtained, the Wassermann of the blood usually is negative, there is no pleocytosis, and phase 1 is negative. They repudiate the statement that a negative Wassermann of the blood must raise serious objection to the diagnosis of paresis.

WASSERMANN TEST. The paper by Uhle and Mackinney² is timely in that it sounds a note of warning regarding too much importance being placed on the Wassermann test. A man consulted these specialists stating that his advancement to an important position was jeopardized because his record contained a diagnosis of syphilis based on a positive Wassermann reaction. He denied ever having had syphilis. A study of the history of this patient revealed the fact that while having a sore

¹ Neurologisches Centralblatt, March 1, 1916, p. 188.

² Journal of the American Medical Association, September 4, 1915, p. 863.

throat a diagnosis of syphilis was made. His blood was examined and found positive. He was placed on active treatment, and at the end of one year, four blood tests were made with contradictory findings. Uhler and Mackinney believed the diagnosis of syphilis had been made on unwarranted grounds. The patient's blood was submitted to five serologists, all of whom reported a negative reaction. A similar case is referred to by these writers. The Wassermann reaction is only of relative value, they state, and should be considered with a careful history and study of the case. Under no circumstances should a diagnosis of syphilis be based on the result of the Wassermann reaction alone. They submitted 325 specimens of blood collected from 292 individuals to at least four serologists. All the laboratories agreed in 21 per cent. of their findings, they disagreed materially in 19 per cent., and varied in from one to four of the ten results in 60 per cent. If a specimen of blood from the same individual was submitted to ten tests by different serologists, there was one chance in five that the tests would agree. These authors conclude that the clinician cannot help but be disappointed in the accuracy of the Wassermann test. When we consider that various representative serologists report positive findings in from 2 to 18 per cent. of normal individuals, and that in active syphilis, in which the clinical diagnosis is certain, some serologists report only 50 per cent. of positive results, there is every reason to discredit the diagnostic value of the test. In suspected latent syphilis and in syphilis under active treatment, the most extreme variations occur, and in these conditions, in which the clinician needs its help the most, it is the least accurate. Notwithstanding the numerous discrepancies in the Wassermann reports, their experience with this test over a period of several years, has convinced them that it is of great value and should be regarded only as a link in the chain of evidence for or against the disease.

SENILE TABES. Tabes is seen in aged people and therefore the cases of Roussy and Rapin,¹ in which the disease was found at the ages of sixty-three, seventy and seventy-eight years respectively, are not exceptional, but are interesting. There are cases in the literature in which tabes developed long after the syphilitic infection, as in that of Dieulafoy, where tabes appeared at the age of fifty-six in a man who had contracted syphilis when twenty-one. In 2 of Dejerine's cases tabes began in 1 at the age of fifty-nine, in a man who had contracted syphilis at the age of twenty, and in the other at the age of sixty-six, when syphilis had been contracted at the age of sixteen years.

One never knows when the tabes began in these aged people, because the disease may be arrested during a long period.

ENTEROPTOSIS IN TABES. It appears from the investigations of R. Koch² that enteroptosis may be tabetic in nature, but it is difficult to

¹ *Revue Neurologique*, July 30, 1914, p. 116.

² *Deutsche Zeitschrift f. Nervenheilkunde*, vol. liv, Nos. 2 and 3, p. 150.

assert this positively. Tabes occurs in those of middle age when ptosis is more common, it occurs with arteriosclerosis and hypotonia of the abdominal muscles; but making due allowance for these conditions, it is probable that the enteroptosis may be the result of implication of the sympathetic nervous system in tabes.

TABETIC OCULAR CRISES. This form of crises was first described by Pel, in 1898, and since then cases have been reported by Haskovec and Knauer. The attacks consist of ocular phenomena in the form of irritation of sensory, secretory, motor and vasomotor nerve fibers. The attacks begin with sudden severe burning and stabbing pain in the eyes, intense lacrymation with photophobia and spasm of each orbicularis palpebrarum muscle. The conjunctiva of the eyes may become red and swollen, and the eyes and area about the eyes hyperesthetic. The appearance of the eyes may be like that produced by rubbing the eyes to relieve the irritation of a foreign body beneath the lid. The condition is one of irritation of the trigeminal nerves.

In a case of this kind observed by me,¹ visual phenomena occurred in association with the tabetic ocular crises. The man spoke of seeing flashes of light, twisting and assuming the shape of reptiles, birds, houses, men, and various forms of animals. He spoke of seeing beds of magnificent flowers which would have given him great delight, as he was totally blind, if it were not for the severe ocular pain which always accompanied these visual phenomena. He was entirely rational. The explanation of these visual phenomena is difficult. They must in some way be caused by irritation of the visual system.

OPERATIONS ON TABETICS. In the past five years over 1000 cases of tabes have been carefully studied in the Cook County Hospital, Chicago, and Nazum² finds that 8.7 per cent. of these have been subjected to laparotomy under mistaken diagnosis one or more times. The crises have been largely the cause of operation. Sixty-five per cent. of the 87 patients operated upon presented visceral crises. In 17 per cent. of these the crises were the initial symptom of their disease.

Mistaken diagnoses and resulting operations occurred chiefly through failure to examine the nervous system.

Gastric ulcer, gall-bladder disease and appendicitis were the diagnoses most frequently made.

Tabetics subjected to several successive laparotomies had, as a rule, been operated on by as many different surgeons.

DIVISION OF ANTEROLATERAL COLUMN OF CORD FOR TABETIC PAIN. This operation promises to be of great service for the relief of pain in the lower part of the body when the cause cannot be removed, as when extensive malignant tumor exists. It was first done in a case reported

¹ Journal of the American Medical Association, March 18, 1916, p. 855.

² Ibid., February 12, 1916.

by Spiller and Martin, later by Edwin Beer, and by Foerster. Souttar¹ seems to be the first to employ the operation for the relief of the pain of tabes.

His patient was a woman with tabes, who had attacks of what may be considered gastric crises; attacks in which vomiting was almost constant and was accompanied by severe pain referred almost entirely to the left side of the abdomen and to the left leg. During an attack the region of pain became so sensitive that the scratch of a pin produced intolerable pain. The symptoms could only be controlled by large doses of morphine, and the patient's condition became desperate. An incision was made in the middle line of the back extending from the seventh cervical to the fourth thoracic spine, and the first and second thoracic arches were cut away, exposing about two inches of dura. A larger amount of cerebrospinal fluid escaped than was expected when the dura was incised. Silk threads were passed around the posterior roots of the second and third thoracic segments, and by means of these the cord was slightly rotated so as to bring its right lateral surface into view. With a special knife having a minute triangular blade, an incision was made into the cord 2 mm. wide, 2 mm. deep, with its posterior extremity 3 mm. in front of the line of origin of the posterior roots, at a point midway between the origin of the first and second thoracic roots of the cord. The incision afforded ample room and the actual section of the cord, though involving delicate handling, was a proceeding of the utmost simplicity.

A few days after the operation (three or four) no trace of motor paralysis was detected. Below the level of operation the whole of the left side of the body and the left leg were totally insensitive to pin-prick. In the same area cotton-wool touch was everywhere perfect, and heat and cold of all degrees were perfectly distinguished, while painful heat was instantly felt as pain. Localization and joint senses were perfect. Several attacks of vomiting occurred but without pain except headache; in no instance was there any other pain, this affording a very striking contrast to the previous condition.

PARESIS. Collins² has studied the clinical histories of 100 cases of paresis that have come under observation during the past six years. In his point of view, paresis is always syphilis. The proportion of women to men is somewhat larger in his statistics than in most statistics, and he interprets this by the statement that women who live the life which men live have not only its enjoyments but also its penalties. Occupation or profession, Collins believes, has no bearing on the etiology of the disease. Although only 40 per cent. of his patients admitted having had syphilis, the blood serum was found to be positive in 87, the

¹ Proceedings of the Royal Society of Medicine, Neurological Section, November 25, 1915.

² Journal of the American Medical Association, March 18, 1916, p. 851.

cerebrospinal fluid positive in 85 per cent., and the colloidal gold test was positive in 97 per cent. of the cases. In thirty-five instances the early symptoms were those that are commonly spoken of as neurasthenic, namely, nervousness, pains in different parts of the body, especially in the arms and legs, and change of outlook toward the world. In half the cases of paresis the patient's complaint at first is more or less indefinite, made up of symptoms considered subjective, and the condition is not likely to be considered sufficiently serious. Loss of memory is frequently mentioned as an initial symptom, and Collins regards it as the most important early feature of the disease. Motor disorder is the next most constant early symptom. It displays itself usually in dysarthria, but not infrequently as ataxia of gait and inability to use the hands dexterously. The only safe rule is to submit all patients in whom one hesitates to make a diagnosis of paresis to a laboratory examination of the blood and cerebrospinal fluid. Collins finds that the paretic usually dies within five years from the onset of the disease.

The Early Stage of Paresis. Nonne has regarded four tests as desirable in making a diagnosis of syphilis, but Southard and Solomon add two others: excess of albumin (Mestrezat test) in the spinal fluid and the gold solution reaction in the spinal fluid. They acknowledge that these six tests are beset with certain technical difficulties, so that no cautious worker is disposed to accept everybody's conclusions as to laboratory interpretation, but it seems likely that no one will question cases in which all six tests are positive. It is improbable that erroneous results would be obtained in all six tests. The positive results in all six tests they think point, not only to chronic inflammatory central neurosyphilis, but to general paresis. They acknowledge, however, that the distinction of paretic from non-paretic forms of central neurosyphilis, none too easy on any grounds, is equally dubious from the standpoint of the six tests as from the bedside and the postmortem analysis.

They report 4 cases which they regard as examples of general paresis from the clinical laboratory point of view, depending chiefly on the spinal fluid cytology and the gold solution reaction. They add, however, that the interpretation of the spinal-fluid pleocytosis between paretic and non-paretic neurosyphilis is not attempted by most clinical laboratory workers. They reject the view that 100 + cells in the spinal fluid indicate non-paretic syphilis and that 4 — 100 cells indicate paresis, as this simple distinction has not been substantiated.

Plasma cells, in their opinion, are not pathognomonic of any disease whatever, although they are more characteristic of chronic than of acute disease, and plasmocytosis characterizes tuberculous as well as syphilitic meningitis. It is far more characteristic of the paretic form than of the non-paretic form of central neurosyphilis, and is a sign more of encephalitis than of meningitis.

In the Psychopathic Hospital in Boston every case with mental symp-

toms is given a Wassermann serum test. This routine practice discovers many cases of unsuspected syphilis, and a case with positive serum receives tests of the spinal fluid. Little is said in the literature as to the diagnosis of syphilis of the central nervous system, as shown by the six laboratory tests before the beginning of symptoms. Systematic works on syphilis of the nervous system or on general paresis give practically no information on the conditions antedating the outbreak of symptoms.

Four cases that Southard and Solomon¹ report in their paper had in common the laboratory tests characteristic of general paresis or cerebrospinal syphilis, and yet no other signs or symptoms that would suggest these diseases. These cases had for years exhibited phenomena such as were the immediate cause of their being brought to the hospital, and if these were suggestive of paresis they had existed for more than ten years without progressing and without exhibiting any physical signs. Is it true that serological findings are present long before the symptoms of paresis? The answer to this question at present cannot be given. It will be given, some day, and by those in charge of such institutions as the Psychopathic Hospital of Boston, where large numbers of cases in the early stage of neurosyphilis may be found. Southard and Solomon refer to the fact that certain cases of paresis showing marked pathological changes at necropsy may have presented symptoms only for a comparatively short time.

Cultivation of the Spirochete from the Paretic Brain. Wile, having successfully implanted the spirochetes and transmitted experimental syphilis to rabbits from the living paretic brain, now with de Kruif² makes a further report of experimental work. At present this experimental syphilis has been transmitted to five generations of rabbits, The initial inoculation of brain was made into the testis of a large rabbit, June, 11, 1915 and thirty-two days later, July 11, large numbers of spirochetes were demonstrable in both testes by aspiration. On August 12, about two months after the initial inoculation, the right testis was removed, one portion being used for implantation into other animals, and the remaining portion for cultural experiments. At the time of the report over four months had elapsed from the time of the initial inoculation, and the organism had been carried through three successful subcultures, as actively motile and as rich as at first.

In the organisms isolated by Wile and de Kruif from general paresis there was no morphologic difference demonstrable, suggesting the existence of a neurotrophic strain of the spirochete. In the cultures the predominating form was the typical fine spirochete with many convolutions, identical with those seen in early cutaneous syphilids. The cultures grew much more slowly and much less luxuriantly than do those

¹ Boston Medical and Surgical Journal, January 6, 1916.

² Journal of the American Medical Association, February 26, 1916, p. 646.

cultivated from the early cutaneous or mucous membrane syphilids. They were extremely viable. Examination, at the time of report, of the original cultures, which had been disturbed by frequent examination and transplantation, still showed moderate numbers of organisms, actively motile and apparently as viable as when first seen.

Intraspinal Treatment of General Paresis. An important discussion¹ on this subject was recently held at a meeting of the New York Neurological Society. Ogilvie reported that all his cases referred to in his communication presented at the original examination the classical syndrome of paresis. All gave positive serobiologic evidence of syphilitic disease in the cerebrospinal fluid, and all but 2 showed positive findings in the blood serum. The average duration of symptoms was one year and nine months, the shortest being six months, and the longest four years and six months. Out of the entire series only 5 were "socially possible" when treatment was begun. Twenty-two of the patients had previously received intensive intravenous and intramuscular treatment over periods varying from six months to two years, and 8 of this number had had remissions of from two to eight months with relapse.

The method of intraspinal treatment employed was Ogilvie's modification of the one described by Swift and Ellis. The curative serum was of standard strength, prepared *in vitro*. The use of this serum in more than eighteen hundred treatments has convinced Ogilvie that it is both safe and effective as a curative agent in types of syphilitic nervous diseases in which intraspinal therapy is indicated. In paresis, Ogilvie has found it to be far superior to serum prepared according to the method of Swift and Ellis, because in this condition, more than all others, a serum of relatively greater strength and uniformity is essential.

The first group comprised 12 cases, or approximately 34 per cent. of the total. All of these were totally incapacitated for work of any kind, 8 being confined in institutions for the insane. In each the remissions were clinically complete, 9 having resumed their former vocations in life. The average duration of the remission at the time of report was one year and two months, the shortest being nine months, and the longest one year and eight months. Biologically, 4 of the 12 were completely negative in both the blood and spinal fluid; 8 were normal as regards the cell and globulin contents, but were positive to the Wassermann reaction in the stronger titrations. Aside from a disappearance of tremors, none of these showed any noteworthy changes in the characteristic physical signs except that there was a very appreciable improvement in the pupillary light reflex in 3 cases. There was marked improvement in the general health of all.

¹ Journal of Nervous and Mental Disease, March, 1916.

The second group comprised 14 cases, or 40 per cent. of the total. All of these were totally incompetent, either confined in institutions or kept at home in the care of nurses. The remissions induced were not complete but sufficiently well marked to render the patients socially possible. None had been able to resume his vocation but all were able to live at home and attend to their daily functions and personal affairs without attendance. The average duration of remissions in this group was twelve and a half months. The cell and globulin contents of the spinal fluid were influenced to varying degrees, the cells being reduced to normal. The Wassermann reaction was favorably influenced in 10 cases, but none became completely negative.

The third group comprised 9 cases, or approximately 25 per cent. of the total. Although 7 of these had partial remissions lasting from one to six months, none was of the character of the first two groups, each suffered a relapse, and all should be counted as total failures both from a clinical and a biological point of view. Some of the most promising cases in the beginning were among this group that could not be influenced by treatment. Only 2 had been committed and 4 of the number had shown symptoms for less than nine months.

Considering the results as a whole, there were twenty-six remissions, averaging over a year each, out of 35 cases. Twelve of these were clinically complete, and 4 of the 12 both clinically and biologically so. Fourteen were incomplete but the improvement was sufficiently well marked to enable the patients to take care of themselves.

Ogilvie would not venture to express an opinion as to the permanency of the remissions. He finds that in true parenchymatous disease of the brain it is practically impossible to secure a complete negative Wassermann reaction, but other factors determine the duration of a remission in a given case besides the presence or absence of positive laboratory findings. In judging the value of intraspinal treatment one cannot take the duration of a remission as the only indicator. He states that a far greater percentage of cases of all kinds respond to intraspinal treatment than to the older methods of treatment. In his series over 74 per cent. were influenced favorably to a degree not approached by the most heroic intravenous treatment either alone or with mercury. An intraspinal treatment extending over many months is often required before the activity of paresis is checked.

An important statement is made by Amsden as to the value of remissions in paresis as an indication of improvement from treatment. An attempt to estimate the value of any treatment in terms of remission is embarrassed by the fact that we have no satisfactory study showing data as to remissions in untreated cases in which the diagnosis was determined with the precision now applied to treated cases. We are compelled to consult our general impression as to the variations in untreated cases and keep in mind the danger inherent to such a

criterion. Amsden says his experience with treated and untreated cases of paresis leads him to believe that the intraspinal treatment with salvarsanized serum has, in a considerable number of cases, a positive influence in checking the progress of the disease, at least clinically. It does not stop it except in very rare cases.

In this discussion B. Sachs took a contrary stand to that of most of the speakers. He had been among the first to advocate intraspinal treatment, but he had become more indifferent and felt that the method had been unduly pushed. The question was whether more was accomplished by this treatment than by intravenous injections. The intraspinal method is more difficult and more likely to lead to serious complications, and has been followed at times by disastrous consequences. He has seen as great and satisfactory improvement follow intravenous therapy. Very little arsenic is found in salvarsanized serum. Almost any injection may change the cell count and globulin of the spinal fluid. He has seen striking remission in paresis follow intravenous injections and there is danger of attaching too much importance to remissions.

Timme has found that intraspinal treatment, intravenous treatment and, in a few cases, no treatment at all, may be attended by great improvement in the laboratory findings. As a result of this discussion it may be stated that some who have used intraspinal treatment in paresis or other forms of syphilis believe that greater success is obtained by this method; others dispute this, and all probably acknowledge that paresis and tabes may be capable of improvement but are incurable.

Swift¹ says that their results in 34 patients with tabes, in whom observations have extended over a year, and some of them nearly five years, 3 of whom received intraspinal treatment alone, the remainder intravenous and intraspinal injections, are as follows: At the time of the last examination, 25 cases, or 73 per cent. had negative reactions with 1 c.c. of fluid. Among these, 14 cases, or 41 per cent. of the total, had negative reactions with 2 c.c. of fluid; an amount which is double the maximum recommended by Hauptmann and Hoessli. In 8 cases the reaction was negative with 1 c.c., but positive with 2 c.c. Three others were not tested with 2 c.c. One case that was negative with 2 c.c. relapsed to positive with this large amount of fluid. One that was positive only with 2 c.c. relapsed to negative with 0.6 c.c. One that was positive with 1 c.c. has relapsed to positive with 0.8 c.c. A number have had negative reactions for from one and a half to two and a half years. The few patients with paresis and taboparesis treated by them have not responded so well. Two out of 3 paretics are dead, the fluid being little affected. A third paretic

¹ Journal of the American Medical Association, July 17, 1915, p. 209.

responded well both clinically and biologically while under treatment, but relapsed twice when treatment was discontinued. One taboparetic responded only slightly, the other better, but relapsed after treatment was stopped. Their experience with their few paretics has been discouraging as compared with the satisfactory results in tabetics.

Swift states therefore that intraspinal injections of "autosalvarsanized serum," or serum to which a small amount of salvarsan or mercury is added, is of distinct help in certain cases of tabes and cerebrospinal syphilis. Not all patients with these diseases require intraspinal treatment. Many of them respond well to intravenous injections of salvarsan combined with mercury and iodides properly administered. In other cases, the symptoms and abnormal cerebrospinal fluids are not controlled by general therapy, and it is in this class that they believe the addition of intraspinal therapy to be of value. Both the clinical side and laboratory evidences of active disease should be considered, and any treatment controlled by repeated examinations of the blood and cerebrospinal fluid. Although the treatment of these diseases should be systematic, it should not be so rigid that individual indications should be disregarded. Not infrequently one sees improvement only after active treatment has been discontinued. Others seem to require constant treatment until all evidences of active disease have disappeared. Only by considering all these factors can consistent beneficial results be obtained.

Swift's statistics regarding tabes would be much more valuable if the laboratory findings in these cases were given before any treatment had been instituted.

Cotton's¹ conclusions in the treatment of tabes and paresis are: In the use of salvarsanized serum we have an agent which does cause definite arrest in paresis, which arrest includes improvement in the symptoms, physical signs and a corresponding change in the biological reactions from positive to negative.

To be effective the case must be treated in the early stages, as advanced stages show no favorable reaction to the treatment.

The length of time is not always an indication of the severity of the symptoms, but the majority of the cases cannot be helped after two or three years have elapsed.

The treatment must be persistent and uninterrupted, and the amount of dose and frequency of treatment must be graded to the condition of the patient.

Taboparesis should be treated cautiously, usually with small doses and not oftener than three weeks.

Remission caused by the treatment cannot be compared with that which is spontaneous, for the percentage of the former is 35.5 per cent. and of the latter case only 4 per cent.

¹ American Journal of Insanity, January, 1916.

The change in the cell count, globulin content, blood and spinal fluid Wassermann reactions are the direct result of the treatment, and are not to be compared with the variation found in untreated cases of paresis.

The efficacy of the treatment depends, not upon the type of method used, but upon the stage of the disease, therefore the diagnosis should be made early in paresis and treatment should be begun as soon as possible.

DEATH FROM NEOSALVARSAN. In the case of fatal termination from injections of neosalvarsan for syphilis reported by Morawski¹ only two injections of the drug were given, amounting to 0.75 gram, with an interval of four days. The amount was small, although Wechselmann has reported cases with death after 0.1 and 0.2 gram of salvarsan. Others have given without serious symptoms a total dose of 1.5 grams salvarsan with an interval of two days. Morawski says the termination in his case could not be attributed to too great concentration of the neosalvarsan as 0.3 and 0.45 gram were given in 2 c.c. of water, nor could it be attributable to the water used, nor to a combined treatment with mercury, as the patient had had no mercury for six months. According to this author it is necessary to assume that certain persons have an intolerance for salvarsan and neosalvarsan. His patient had paresis and arteriosclerosis but he should, notwithstanding the latter, have been able to stand so small an amount of neosalvarsan. Morawski concludes however, that it is more prudent to avoid these drugs in advanced paresis with vascular disease.

INJECTIONS OF MERCURIALIZED SERUM. Further study by Byrnes² of the effects of intraspinal injection of mercury has led to interesting results. He chose 15 cases, divided into three groups of 5; 5 were treated by inunctions; 5 by biniodide injections intramuscularly; 5 by bichloride by mouth, and all were carried to the point of mercurialization when specimens of blood and spinal fluid were obtained and sent to a chemist for determination of the mercurial content. In general those who received inunctions showed a larger percentage of mercury in the serum. In 1 case only was a minute quantity of mercury detected in the spinal fluid. Byrnes found that 18 c.c. of human serum would hold in solution 1 gr. bichloride as the albuminate of mercury. At first an extremely small dose of the prepared albuminate was used and gradually the dose was increased to $\frac{1}{30}$ gr. without harm, and later to $\frac{1}{25}$ gr. Mercurialized serum may be kept indefinitely and it is not necessary to have the patient's serum, since horse serum can be used without harmful results.

Byrnes reported the results of intraspinal treatment of mercury in 15 cases, 8 were cases of tabes, 3 of cerebrospinal syphilis, 3 of

¹ *Revue Neurologique*, April, 1915, No. 16, p. 242.

² *Journal of Nervous and Mental Disease*, November, 1915, p. 750.

general paresis, and of taboparesis. All showed some improvement and several could be regarded as clinically well except for permanent organic changes. In all except 1 there was an early and pronounced reduction in the cell count and globulin content of the spinal fluid. In three instances the Wassermann test showed a lowered percentage of fixation; in 4 it became negative; in 1 it changed from positive to doubtful. The remaining 8 cases had been treated too recently to permit of trustworthy deductions. The greatest number of treatments which had been required to produce a reduction in cell count and definite improvement in symptoms had been six, the average being three.

We are desirous of obtaining testimony regarding this method introduced by Byrnes and therefore read with interest the results of E. L. Hunt's¹ observations on 45 cases. They are:

1. The reaction from mercuric chlorid or sublamin in no way differed from the reaction which followed the administration of salvarsan.
2. The sublamin did not seem to give the same reduction in the cell count or clinical improvement as did the mercuric chloride.
3. No ill-results followed these injections. Three deaths that occurred could be accounted for, as the patients were practically moribund at the time of the treatment, and were given the injections as a last resource.
4. The patients with tabes and cerebrospinal syphilis were helped more than any others.
5. Such improvement as did occur was evident in the feelings of the patient, in the sphincter control, in the pains, in the gait, and in the serology. There was no improvement in the reflexes.
6. Such intraspinal treatment can be given only at intervals of two weeks, because a cell count does not fall sooner.
7. The reaction obtained was one in which the cell count was first greatly increased, and then diminished.
8. The cell count and the globulin yielded much sooner than did the Wassermann.

Of Hunt's patients 40 were given intraspinal injections of mercuric chlorid, and 5 were given sublamin injections, so that in all there were given one hundred injections of mercuric chloride and thirty-three injections of sublamin.

TREATMENT OF NERVOUS SYPHILIS BY DRAINAGE OF CEREBROSPINAL FLUID. A rather striking idea in the treatment of syphilis has been advanced by Gilpin and Earley.² They explain the absence of improvement in syphilis of the nervous system from arsenic or mercury in the blood in the following manner: Either the choroid plexus will not allow substances such as arsenic and mercury to pass, or if such substances pass into the cerebrospinal fluid it must be by osmosis, and

¹ Journal of the American Medical Association, February 5, 1916, p. 404.

² *Ibid.*, January 22, 1916, p. 260.

this does not take place when the pressure of the cerebrospinal fluid equals the pressure of the blood in the venous sinuses and capillaries. It may be well to state here, however, that experience has shown that syphilis of the nervous system often is greatly influenced by mercury or arsenic in the blood.

Gilpin and Earley propose to saturate the patient's blood with either salvarsan or mercury, and at intervals to drain off the cerebrospinal fluid by lumbar puncture, in this way to lower the pressure in the cerebrospinal sac, and thus cause the drugs to osmose through the capillaries. They have drained their patients once a week, and have drained off as much cerebrospinal fluid as will flow: from 20 c.c. as high as 40. They report only 3 cases treated in this manner, and acknowledge that the time of observation was too short for a decision as to results.

INJECTION OF NEOSALVARSAN INTO THE LATERAL VENTRICLE IN PARESIS. The cases of paresis treated in this way by Hammond and Sharpe¹ are too few to permit positive conclusions as to the advisability of the method. They believe that on experimental and clinical grounds both the subdural and intraventricular methods are superior to the intraspinal route in the treatment of paresis. From an experimental and theoretical standpoint, they think the intraventricular method is superior to the subdural route and is safer. They do not enter the ventricles through the corpus callosum, but through the first or second frontal convolution.

The scarcity in the supply of salvarsan and neosalvarsan since the war began has led to the placing of *substitutes* upon the market, and at present there is some doubt as to the value of these. The arsenobenzol prepared by Schamberg, Raiziss and Kolmer has been tested in cases of syphilis by Ormsby and Mitchell,² and their conclusions are that with mercury the new preparation offers as good a method of treatment of syphilis as any heretofore used. In its uniform and non-toxic action, arsenobenzol commends itself as a remedial agent of great value in the treatment of syphilis, and its successful preparation marks an achievement in American chemotherapy.

While a sufficient experience has not yet been had from which to draw ultimate conclusions, these investigators believe its therapeutic accomplishments, together with its safety of administration, recommend its continued employment.

Remissions in Syringomyelia. Remission of all symptoms in syringomyelia during seven years, *i. e.*, disappearance of sensory disturbances and of muscular atrophy and return of reflexes, makes the case of Stähle³ of unusual interest. Such a disappearance of symptoms is attributed to resorption of blood or fluid, and is known to occur in syringomyelia,

¹ Journal of the American Medical Association, December 18, 1915, p. 2147.

² Ibid., March 18, 1915, p. 866.

³ Deutsche Zeitschrift f. Nervenheilkunde, vol. liii, No. 5, p. 404.

but Stähle's case is remarkable in the long duration of the remission. It was without necropsy.

ABRUPT ONSET OF SYRINGOMYELIA. Syringomyelia may commence in a very abrupt manner, as shown by a case reported by Roussy and Lévine.¹ A soldier while in the trenches suddenly felt very cold in the whole body, but later felt cold only in the left upper limb, and this limb seemed to be paralyzed. A diagnosis of neuritis of the left upper limb was made. An examination three months later showed that the lesion was syringomyelia with atrophy, claw-hand, and syringomyelic dissociation of sensation. It is possible that in such a case hemorrhage may occur into a cavity previously existing.

Spinal Tumor. The case of tumor reported by Robertson and Ingham² is of special interest on account of the size of the tumor, the character of the tumor, and the improvement after the removal of so large a growth. The posterior portions of the vertebræ were removed from the tenth thoracic to the third lumbar inclusive, exposing the cord from the twelfth spinal segment downward. On opening the dura a large tumor was seen, practically filling the canal and preventing the escape of spinal fluid. The entire tumor was removed. It had its origin apparently in the cord substance superficially, and measured five and one-half inches in length, and about one inch in width at its widest portion, and was evidently an unusually large tumor. Microscopic sections showed it to be a cholesteatoma. On the eighth day following the operation the patient was able to void urine voluntarily and was not catheterized again. The bowels at first constipated and incontinent after a laxative, gradually became normal, with very slight tendency to constipation. As the nerves of the bladder and rectum must have been exposed to much pressure by this large tumor situated over the end of the cord, this rapid improvement in the function of the bowels and bladder is remarkable. Other symptoms lessened and the general improvement was marked.

As the woman had always been delicate and *x*-ray examination had shown congenital anomalies of the lumbar spine, it was believed that the tumor had been present since birth. With the onset of definite spinal phenomena the woman began to lose flesh rapidly, and soon became greatly emaciated. Robertson and Ingham have noticed that in all of the published cases of spinal tumor they have found in the literature, when this matter was mentioned, loss of flesh has been a striking sign, and they state that the general loss of flesh in addition to atrophy dependent upon local cord lesions has received no satisfactory explanation.

INTRAMEDULLARY SPINAL TUMOR. An extramedullary spinal tumor often is painful while an intramedullary tumor usually is painless,

¹ *Revue Neurologique*, July, 1915, p. 587.

² *Pennsylvania Medical Journal*, March, 1916, p. 408.

but an extramedullary tumor may be painless and an intramedullary tumor may cause pain, as shown formerly by Auerbach, and now by Karger.¹ It is difficult to make a clinical diagnosis between intramedullary and extramedullary tumor, and Karger's paper shows, as he himself states, that no known symptoms permit a positive differential diagnosis between these two forms of tumor. In uncertain cases laminectomy alone may be decisive, but it may prove to be of diagnostic rather than curative value.

Varicose Veins of the Spinal Cord. The importance of anomalies of the veins of the spinal cord in producing symptoms is clearly presented by Elsberg.² In 130 laminectomies for spinal disease he has six times found one or several enlarged spinal veins on the posterior surface of the cord. In all but one of the patients the enlarged vein ran a straight course; in several instances the enlarged vein accompanied one of the spinal roots to the dural opening. All of the patients had the signs and symptoms of a lesion at a definite level, and the greatest or only enlargement of the vein was found at the part of the cord corresponding to the symptoms. Two of his patients suffered from severe root pains and large veins were found to accompany the affected spinal roots. He concludes that there was some connection between the enlargement of the vein and the cord symptoms. Whether the venous enlargement was the primary condition and the cord disease was secondary, whether the reverse was the case, or whether both played a part in any of the patients he finds it impossible to say with certainty. In two the symptoms and signs were so similar to those of a spinal tumor that a diagnosis of spinal tumor had been made. The discovery of the enlarged or varicose vein was in each instance an operative finding. That the abnormality was not temporary, perhaps resulting from exposure of the cord and the change in pressure conditions, was proved by the fact that the spinal vein of the other side always appeared normal in size and position.

The results obtained by excising these enlarged veins are interesting. Of the 6 patients, 2 had spastic paraplegia with sensory level symptoms of long standing, and their condition was unchanged after the operation. A patient with tuberculoma of the cord improved very much, but the improvement was from removal of the growth. A patient who had suffered from severe root pains confined to the distribution of the left eighth thoracic root, and in whom a much-enlarged vein ran with the root, was entirely relieved by the laminectomy and excision of the large vein. Two patients were supposed to have spinal tumor, but nothing excepting the localized venous enlargement was found at the operation. Both patients had well-marked sensory and motor signs, and marked improvement followed the surgical intervention. One of the

¹ *Monatsschrift f. Psychiatrie und Neurologie*, vol. xxxix, No. 3, p. 167.

² *American Journal of the Medical Sciences*, May, 1916, p. 642.

patients recovered entirely; it may be, Elsberg states, that this remarkable result was caused by the decompressive effect of the laminectomy.

Circumscribed Serous Spinal Meningitis. So few cases of simple cysts of the pia arachnoid are reported in the literature that it is well to refer to the 2 cases with operation recorded by A. L. Skoog.¹ In his first case the very thin wall of the cyst was torn during the operation and the fluid escaped, precisely as in the first case of this disorder described by Spiller, Musser and Martin in 1903. The fluid also in Skoog's case appeared like cerebrospinal fluid. The cord seemed to be diminished in size from the pressure. The case could not be followed but there was said to be a slow improvement of all the impaired functions. In his second case a simple cyst was revealed covering the posterior surface of the cord, and extending a distance of about 2.5 cm. It also was torn by traction during the operation. Continuous improvement in all the symptoms occurred and in the last report the patient was said to be "getting along nicely" and was employed in household duties.

Skoog gives a good review of the literature and considers the various forms of cysts known.

The case of spinal cyst reported by Bouche² seems to belong clearly to the class under discussion, and is of interest, as some skepticism as to the occurrence of these cysts has existed among some French writers. Bouche's patient entirely recovered after the operation.

The carefully studied case reported by Paul Schuster does not appear to have been one of simple spinal arachnoid cyst. At the operation the dural sac seemed strikingly enlarged and when it was cut cerebrospinal fluid squirted out under high pressure. The dura was slightly united with the pia and the latter appeared roughened. Death occurred within two weeks after the operation and old adhesions about the cervical cord and milky clouding of the pia of the brain were found. Schuster concludes that a cyst of the spinal membranes must have existed, but this cyst was not discovered either at the operation or necropsy, and it is questionable whether Schuster's³ conclusion is warranted. There is evidently more than one condition represented in the term circumscribed serous spinal meningitis.

A most valuable contribution to this disorder is the recent paper of Gerstmann.⁴ He reports 6 cases and reviews carefully the literature. In many cases no cause could be found and these cases he considers as primary forms of the disease, provided recovery with disappearance of symptoms resulted from operation, otherwise some doubt as to the primary nature must be entertained. Extradural or intradural lesions

¹ Journal of the American Medical Association, July 31, 1914, p. 394.

² Revue Neurologique, July 30, 1914, p. 69.

³ Monatsschrift f. Psychiatrie und Neurologie, vol. xxxvii, No. 6, 1915.

⁴ Zeitschrift f. d. g. Neurologie und Psychiatrie, vol. xxix, No. 2, p. 97.

have been found in the majority of cases and were the cause of circumscribed serous meningitis, and frequently these lesions have been in the vertebral column.

A circumscribed collection of fluid has been known to follow operation on the vertebral column, especially after removal of tumor, and also it has been observed above or below an intradural spinal tumor, or in connection with chronic hypertrophic pachymeningitis. Gerstmann does not clearly differentiate this collection of fluid from the encapsulated arachnoid cysts of the spinal cord, and the distinction is an important one. Some cases of circumscribed serous meningitis have followed trauma. He is unable from the study of his 6 cases to find any symptoms which may enable us clinically to distinguish between this condition and tumor of the cord, and therefore operation is the only means of treatment. Experience obtained from the war has given reason to believe that trauma, as from bullet wounds, may cause the circumscribed serous meningitis.

Bastian's Law. According to *Bastian's law*, a complete, transverse lesion of the spinal cord above the reflex arcs causes a loss of the reflexes dependent on the integrity of the lower part of the cord, but it has not been found invariable, and in some cases the reflexes have been preserved. It is difficult to prove that a lesion is complete, and a partial lesion with softening may be made complete in the removal of the cord. Sittig¹ has studied a case with necropsy in which complete transverse lesion was demonstrated. The paralysis at first was flaccid in the lower limbs, later spastic, and at first all reflexes in the lower limbs were absent, but later the patellar reflex returned in the paradoxical form (contraction of the semitendinosus and semimembranosus instead of the quadriceps), although still later contraction of the quadriceps was obtained in testing the patellar reflex. As Bergl's injection method was employed (injection of 10 per cent. formalin into the dural sac as soon after death as possible) in this case, injury to the cord at the necropsy was improbable. Sittig believes his case in connection with one reported by Kausch makes Bastian's law unreliable.

Poliomyelitis. The treatment of this disease by serum injections has been successful as practised by Arnold Netter.² He has used only human serum obtained from persons who had had poliomyelitis previously. Experimental poliomyelitis in the ape as produced by inoculation with the virus is very severe and fatal, and a useful serum has not yet been obtained from an animal. The serum of a person who has had poliomyelitis has early a neutralizing effect on the virus. Netter has found the serum effective twelve days after the beginning of the disease and as late as eleven years, and even later; others have found the serum useful as late as thirty-two years after the disease. Netter believes the

¹ Monatsschrift f. Psychiatrie und Neurologie, November, 1915, p. 257.

² Bulletin de l'Académie de Médecine, October 12, 1915, p. 403.

best period for removal of the serum is three months to four years after the attack of poliomyelitis.

The serum is obtained from a vein and kept aseptic and the health of the donor is previously ascertained and a Wassermann reaction made. The injections are always within the spinal canal after removal of a somewhat greater quantity of cerebrospinal fluid than of the serum injected and the patient is placed in a position with the head lowered after the injection to allow the serum to mingle with the cerebrospinal fluid. The technic is like that employed in serum injection in cerebrospinal meningitis. The quantity of serum varies from 5 to 13 cubic centimeters. The dose must be repeated and if possible eight should be given, one being given daily.

The injection of human serum into the spinal canal is usually without unpleasant complications, it causes always an inflammatory reaction of the meninges as shown by alteration of the fluid obtained by later spinal puncture. The fluid contains fibrin and more albumin, the cells are more numerous and polynuclear leukocytes predominate and may be abundant. Clinical signs may be pain in the back, muscular hyperesthesia, stiffness of the back and neck, and rise of temperature. In two of Netter's cases the symptoms caused anxiety, and they may be grave in exceptional cases. It is possible that the symptoms produced by the development of the disease may be attributed to the serum injections.

Netter has treated 32 cases of poliomyelitis in different stages of the disease by serum injection. He has obtained in 6 cases complete and rapid recoveries, in 3 amelioration approaching recovery, in 7 marked amelioration, in 5 improvement of more doubtful character, and in 3 no effect. Eight deaths occurred by implication of the medulla oblongata.

The usefulness of the injections is shown by the rapidity of the improvement day by day during the treatment, and the arrest in the progress or increase of symptoms if the injections are stopped too soon. Serum therapy may arrest oncoming paralysis, or may cause some palsies already produced to disappear if employed early.

Alfaro and Hite¹ have employed Netter's treatment in one case. A baby, seven months old, was completely paralyzed on the fourth day of acute poliomyelitis; swallowing was difficult and respiration shallow and irregular. As the condition was growing worse, 2 c.c. of serum from two children, who had had the disease a few months before, were injected into the child's spinal canal the seventh day of the disease. Improvement was evident and daily injections of 1.5 to 2 c.c. of the serum caused the paralysis to disappear. There was no local or general reaction to any of the injections, and a total of 25 c.c. was thus injected

¹ Abstract in Journal of the American Medical Association, December 4, 1915, p. 2043.

in the course of two weeks. The child soon recovered completely. The article is written in Spanish.

Mental Symptoms in Multiple Sclerosis. Multiple sclerosis is so uncommon in this country that it is not likely many clinicians will observe mental symptoms in the disease. They do occur and are known. D. Maxwell Ross¹ is able to report 5 cases observed in the Royal Edinburgh Mental Hospital. The most striking symptom is emotional instability. In 2 of his cases there was a characteristic euphoria; in 1, although the moods showed great variability, the prevailing one was that of depression; in another the disturbance took the form of extreme irritability.

It is not surprising that in a disease so chronic as multiple sclerosis emotional disturbances should occur, and therefore we can accept Ross's statement that in practically all the literature on the subject attention is drawn to these disturbances. Charcot spoke of a blunting of the emotional faculties and stated that the dominant feeling is one of stupid indifference to all things.

The tendency to uncontrollable laughter or tears has been compared by Ballet with that found in pseudobulbar palsy, and it may exist alone or in association with mental symptoms, and mental symptoms may exist without the uncontrollable laughter.

There may be an exaggerated interest in minor affairs and indifference to more important matters which Ross considers so characteristic of most forms of insanity in which slight enfeeblement exists. Defect of memory is common, delusions are rare but paranoid ideas do occur. In a disease in which the general symptoms vary so greatly as they do in multiple sclerosis one would expect a similar variability in the mental symptoms, depending on the extent and situation of the lesions. It seems, however, that especially characteristic are enfeeblement of the intellect as a whole and a disturbance of the emotions.

LONG REMISSIONS IN MULTIPLE SCLEROSIS. Remissions in this disease are not very rare, and a remarkable case illustrating these remissions was published by A. Ninian Bruce,² in 1912. This observer now reports another case, in which there has been so far only one remission, but this lasted twelve years. The recurrence followed soon on a severe wetting the patient, a soldier, received. The first attack was said to have lasted only about three weeks and had also developed after a severe wetting. The second attack had almost disappeared within three weeks.

Enuresis Due to Maldevelopment in the Spinal Cord. Under the name myelodysplasia, Alfred Fuchs, in 1909, described anomalies of development and enuresis nocturna, associated often with spina bifida occulta, and depending on imperfect development of the lower part of the cord.

¹ Review of Neurology and Psychiatry, August, 1915, p. 361.

² Ibid., January, 1916, p. 1.

The important features of this condition are:

1. Weakness of the sphincters and especially enuresis nocturna persisting after puberty.
2. Syndactylism between the second and third toes, more rarely between the second, third, and fourth toes, still more rarely between the other toes; usually bilateral.
3. Disturbances of sensation, chiefly of temperature sensation, not strictly radicular in type, especially in the feet and more frequently only in the toes.
4. Defect of the sacral canal recognized by the Röntgen rays.
5. Anomalies of cutaneous and tendon reflexes in the abdomen and lower limbs.
6. Defects in the feet in many cases (pes planus, varus, valgus), sometimes with peroneus weakness, also trophic and vasomotor disturbances in the toes. Other anomalies may be found.

This subject has received little attention and therefore I¹ have thought it worth while to present a short paper upon it. Whether defective development of the lower part of the cord without defect in the sacrum and lumbar vertebræ is a common cause of enuresis nocturna with or without the described anomalies of development we have no means of determining positively, without necropsies, but in all doubtful cases The Röntgen rays are of service.

Another cause of enuresis is by stretching the cauda equina in forcible bending of the trunk forward.

Hereditary Spina Bifida. It is not widely known that spina bifida may be transmitted from parent to child, and it usually is not transmitted; possibly because a person with this deformity is likely to be impotent as a result of implication of the spinal cord, or to die from trophic disturbances or cystitis and pyelonephritis before adult life. In a family observed by Jancke,² the grandfather and father of his patient had weak bladders. The patient had never been able to hold his urine and Röntgen rays showed spina bifida. Two of his brothers had weak bladders. The patient had three children; the eldest five years old, the youngest nine months, and all three likewise had weakness of the bladder. In three members of this family defective sacrums were found. If attention be directed to this matter, the occurrence of spina bifida in families may be found more frequently.

The "Stretching Symptom" in Cauda Equina Disease. As "Zerrungssymptom," which might be translated stretching symptom, Schlesinger³ means pain produced by sitting down in cases in which the cauda equina is diseased. He has observed it seven times in eight years, evidently therefore it cannot be considered as common. The disease of

¹ American Journal of the Medical Sciences, April, 1916, p. 469.

² Deutsche Zeitschrift f. Nervenheilkunde, vol. liv, No. 4, p. 255.

³ Neurologisches Centralblatt, July 1, 1915, p. 450.

the cauda equina may be of various kinds. The person presenting this sign complains of violent pain while sitting, although he has no pain while lying down, standing or walking. The pain is felt in the anal region and genitalia or rectum, and may be so severe that sitting is avoided. In all Schlesinger's cases distinct symptoms of caudal lesion were present. Two of his patients had had epidemic meningitis, 2 syphilitic caudal disease, 1 had the sign following a fall, and 1 after being shot. The symptom persisted many weeks, and in 2 cases lasted for years. For example, a physician with syphilitic caudal disease had moderate disturbance of bladder and rectum and symmetrical anesthesia about the buttocks and down the posterior aspect of the thighs. When the man sat down the pain was beyond description, and was chiefly in the rectum and perineum. He had difficulty in practising his profession on this account, and constructed an inclined plane which allowed him to assume a position approaching that of sitting.

A woman with epidemic meningitis experienced great pain at the moment lumbar puncture was done. The pain following radiated into the vagina and clitoris, and was present only when she was sitting, and almost caused suicide.

An officer who had been wounded and had symptoms of a caudal lesion, cried out with pain when he sat down. He described it as though someone were boring in the rectum with red-hot instruments.

Schlesinger regards the sign as analogous with Kernig's sign, and believes that both signs depend on stretching of the roots, which are affected by meningitis and fixed by adhesions. In sitting, these lower firmly bound roots are stretched. In one case after this stretching symptom had disappeared, it could be reproduced by bending the head strongly forward while the man was sitting.

Cord Injuries. Some curious injuries are being reported from the war zone. Thus Jumentié¹ recorded a case of hemorrhage into the substance of the cord extending through six thoracic segments, a distance of 9 centimeters. There was no meningeal hemorrhage, the dural sac was intact, and the cord did not appear externally to be disturbed. Although there was fracture of one vertebra no fragment of bone apparently had damaged the cord.

Still more interesting as an example of injury of the cord apparently without sufficient lesion is a case reported by Babinski.² A man was 2 or 3 meters from a shell when it exploded. Immediately he felt severe pain at the level of the kidneys, and as though he had lost his lower limbs, and he was unable to move. The lower limbs were flaccid. The bowels did not move for four days, the urine was not evacuated for two days. Twenty-seven days after the injury he was able to stand. It was one of those curious cases described as injury from the "vent du boulet."

¹ *Revue Neurologique*, July, 1915, p. 579.

² *Idem.*, p. 581.

or by the English as from the "wind of explosives." There had been no injury from any fragment of the shell. The lesion was supposed to be *hematomyelia*.

Pernicious Anemia. Byrom Bramwell¹ believes that in many cases of subacute combined degeneration of the spinal cord in which the anemia does not at first conform to the pernicious type, the anemia probably is pernicious anemia. He records a case as illustration. A man had symptoms of spinal-cord disease. A fortnight before his death a blood count showed no features suggestive of pernicious anemia; the condition of the blood at that date was as follows: red corpuscles 4,200,000 per c.m., hemoglobin 70 per cent., color index 0.8. During the next fortnight very rapid deterioration of the blood took place without loss of blood or other obvious cause. Two weeks after the above results were obtained the red corpuscles were 600,000 per c.m., hemoglobin was 28 per cent., color index 2.3. Some normoblasts and megaloblasts were present in the blood, which presented all the characteristic features of pernicious anemia.

In this case there was for three years no marked anemia while nervous symptoms of subacute combined degeneration were present; then suddenly rapid destruction of the blood took place. He believes that in some cases the toxin acts entirely on the blood, the result being pernicious anemia without spinal symptoms. In other cases the toxin acts entirely or chiefly upon the spinal cord; in these cases there is subacute combined degeneration without anemia or with slight anemia. In some of the latter group profound pernicious anemia is ultimately developed.

In some cases the toxin from the first, or at least when the patient comes under observation, acts both on the blood and the spinal cord, the result being typical pernicious anemia with subacute combined degeneration of the spinal cord.

The treatment of pernicious anemia is so discouraging that the method suggested by Bartolotti² arrests our attention even though we feel that his statements should be confirmed by other investigators with more cases. Bartolotti finds that the red cells are increased in number by the use of antidiphtheria serum, and that this increase reaches its height on the fourth or fifth day and then gradually declines, but the cells never drop to their former figure. Antistreptococcus and antistaphylococcus serums have the same action but less pronounced than that of antidiphtheria serum. Extracts of various organs have a notable influence in severe secondary anemia. He treated a woman of thirty-eight, with severe pernicious anemia who was not benefited by iron and arsenic, with antidiphtheria serum, giving four injections of 1000 units each, with intervals of forty, sixteen and twenty-one days. A week after the first injection he commenced combined organotherapy, giving extract of spleen,

¹ *Edinburgh Medical Journal*, April, 1915.

² Abstract in *Journal of the American Medical Association*, June 19, 1915, p. 2106.

spinal cord and blood alone or combined; the daily dose was about 0.5 gm. of the extract, gradually increasing to 2.75 gm. a day and then diminishing. By the fourth day after the first injection of antitoxin the reds had increased from 823,750 to 1,618,000, and by the sixth week to 3,832,000, while the hemoglobin from 35 to 30 had risen to 90 per cent. Nearly six months after suspension of all treatment, the complete course having taken thirteen weeks, the hemoglobin was 95 per cent. and the reds numbered 5,084,000; the blood findings otherwise were also normal.

A brilliant result undoubtedly, but will the treatment work equally well in other cases?

Acro-ataxia and Proximo-ataxia. The distinction between acro-ataxia and proximo-ataxia, as made by Hoover,¹ may prove to be of importance if the observations of others lead to the same conclusions as do those of Hoover. This investigator employs acro-ataxia as a term to designate an impairment in the muscular sense of the intrinsic muscles of the hands and feet in contradistinction from ataxia of the proximal muscles of the upper and lower extremities. In a patient with pernicious anemia there may be loss of all muscular sense in the intrinsic muscles of the feet without static ataxia, because the muscular sense of the iliofemoral muscles is unaffected. The anemic patient will have difficulty in buttoning a waist, washing dishes, sewing and writing, but when the finger to finger and finger to nose tests are tried all indications of ataxia are wanting. In spinal cord disease Hoover finds that proximo-ataxia always precedes acro-ataxia. The tabetic person will have a very pronounced loss of muscular sense in the iliofemoral muscles long before there is a loss of the sense of position in the toes. He will also lose the muscular sense in his thoracoscapular and scapulohumeral muscles before there is any loss of muscular sense in the hands. Acro-ataxia is seen only in advanced spinal-cord disease, and is seen without proximo-ataxia only in the primary anemias and peripheral neuritis. All this is most interesting and somewhat surprising. We have not had reason to believe that the nervous symptoms of pernicious anemia are caused primarily by changes in the peripheral nerves, and one may desire further studies on the ataxia of incipient tabes. Hoover is a careful observer and his conclusions should attract attention.

Nerve Injuries. Babinski² has noted many interesting phenomena in nerve lesions in soldiers, such as the association of hysterical and organic palsies. When the median nerve is paralyzed and the forearm is placed in pronation, electrization of the biceps causes pronounced supination, more so than in a normal limb. It is explained by loss of tonicity in the pronators innervated by the median.

The observations of Marie and Athanassio-Bénisty³ that nerves

¹ American Journal of the Medical Sciences, November, 1915, p. 651.

² Revue Neurologique, May and June, 1915.

³ Idem.

react differently to similar lesions are remarkable. The musculospiral when injured reacts by paralysis of motion but seldom with pain, and when pain is present it usually depends on lesions of the joints or bones. Lesions of the median cause much pain at the moment of injury and the pain may be the chief symptom after a few days. Lesions of the ulnar may be painful at the time of injury, but very intense and persistent pain occurs only when the median also is implicated.

There seems to be a tendency for certain muscles to be especially affected, and always the same muscles supplied by a part of the nerve, and each nerve seems to have its own way of reacting to a lesion; thus vasomotor disturbances are rare in lesions of the musculospiral and usually are present in lesions of the median. Henry Meige and Madam Athanassio-Bénisty¹ have found that the injury of the musculospiral usually causes painless paralysis, that of the median or sciatic, especially of the internal popliteal branch, produces pain chiefly. In 40 cases of lesion of the musculospiral nerve 35 were without pain; the other five cases presented pain. In 35 cases of lesion of the median nerve 24 were with severe pain. The proportion in which pain occurs is 12.5 per cent. in lesions of the musculospiral and 70 per cent. in lesions of the median. In 60 per cent. of the lesions of the sciatic pain was slight or absent, in 40 per cent. it was severe. In 30 per cent. of ulnar lesions pain was present.

It may be said that three-fourths of the cases of lesion of the median are painful, one-half of the lesions of the sciatic, one-third of the lesions of the ulnar, and scarcely one-eighth of the lesions of the musculospiral.

From the great experience which Nonne² has obtained from wounds of periphrical nerves by bullets during the present European war, it has become evident that an injured nerve may be associated with paralysis only in a part of its muscular distribution. This partial palsy is true of any nerve. Even from high lesions of the sciatic nerve often only the peroneus or the posterior tibial nerve is paralyzed. This has been observed also when the nerve was injured within the pelvis. After a high lesion of the sciatic nerve only the anterior tibial muscle was paralyzed in one case. It is important to remember that only fibers within a nerve destined for certain muscles may be damaged in a nerve lesion while others escape.

Nonne emphasizes a fact that is well known but liable to be forgotten, viz., that muscles contracting normally to volition may yet show reaction of degeneration. Motor palsy without sensory changes is not uncommon after lesions of a nerve, and when sensory changes occur they may be confined to a limited portion of the nerve supply. Nonne found severe pain the exception after severe nerve lesions. He also found that reaction of degeneration might be present only in a part of the territory of a

¹ *Revue Neurologique*, Nos. 20 and 21, p. 706.

² *Medizinische Klinik*, 1915, Nos. 18 and 19.

completely paralyzed nerve. From his experience one cannot decide that preservation of faradic irritability of muscles after a nerve lesion indicates preservation of galvanic irritability; and on the other hand he has obtained prompt galvanic contractions of muscles when the muscular irritability to the faradic current was lost.

The time of operation for complete paralysis after nerve injury is regarded differently by different investigators. Nonne thinks that in cases of complete paralysis operation should be done within a few weeks if the paralysis has not disappeared, also it should be done in about the same time if complete reaction of degeneration is present.

In regard to the important and disputed subject of the treatment of nerve injuries, Dejerine¹ holds that in all cases of lesion of the peripheral nerves an exploratory incision is desirable. The intensity of the paralysis and of the anesthesia, and the disturbances of electrical contractility are not sufficient for a decision whether a nerve be completely or partially divided, or surrounded by cicatricial tissue, or compressed by a fragment of bone or metal. Compression by cicatricial tissue causes pain which disappears when the nerve has been freed.

Brachial Plexus Palsy. The treatment of this condition presents some serious problems. Sharpe² recommends when the palsy is caused by birth injury and is total, that the plexus should be exposed at one month of age. The child will stand the operation at that age better than at an earlier date, and as well as at any time several months later. Little if any anesthesia need be used at one month of age, and, in most operations on children under one year of age, the danger of the anesthetic is the greater risk. The earlier the anastomosis of the nerve roots, the more perfect will be the union of the nerve fibers and consequently a greater improvement will occur ultimately. The earlier the operation, the less the formation of fibrous tissue.

About half of the children operated on by Sharpe at one month of age have shown marked improvement, and in four it may be possible to obtain a normal arm. As a rule, the children operated on at three months of age have shown a more constant improvement, but he believes if these children had been operated on at one month of age a greater ultimate improvement would have occurred. There were no deaths in his series of fifty-six cases.

Late Palsy of Ulnar Nerve. A neuritis of the ulnar nerve which develops many years after fractures and dislocations about the elbow-joint is spoken of by Hunt³ as tardy or late paralysis. The injury to the joint may have been received in childhood, and the first symptoms of ulnar neuritis may not appear until adult life, so that an interval of six to thirty-five years may occur. The progressive atrophy of the small

¹ *Revue Neurologique*, May and June, 1915, p. 381.

² *Journal of the American Medical Association*, March 18, 1916, p. 876.

³ *Ibid.*, January 1, 1916, p. 11.

muscles of the hand in such a case may mistakenly be attributed to progressive spinal muscular atrophy. The ulnar nerve seems to have a special predisposition to this palsy, and while late palsy has been observed in the median nerve in one case, in combination with ulnar neuritis (Bernhardt), it is so rare in that distribution as to constitute a clinical curiosity. The motor symptoms in late ulnar palsy predominate, and the sensory symptoms may be very slight. Absence of fibrillary twitching and limitation of atrophy to the ulnar nerve distribution distinguish this atrophy from that of spinal origin. The essential etiological factor is the deformity and malposition of the elbow-joint, usually the result of fracture dislocation in early life. Where a cystic tumor or growth of bone compresses the nerve, removal of the obstruction is desirable. When the ulnar groove is deformed and shallow, it may be necessary to enlarge and deepen it. The neuritic symptoms are slowly progressive and run an extremely chronic course. In some instances resection of the thickened portion of the nerve trunk may be desirable, or in other cases transposition of the ulnar nerve to the anterior surface of the internal condyle may be desirable.

Trifacial Nerve Palsy. It has become necessary in Germany on account of the scarcity of benzol and similar substances to employ a fluid known there as trichloraethylen, and it has produced remarkable symptoms. It has shown an affinity for the sensory part of the trifacial nerve comparable to that of lead for the posterior interosseous nerve. Four cases of poisoning by this substance have been reported by Plessner.¹ No other fluid is known to have this selective action for the trigeminal nerve. In the first 3 cases the symptoms were severe, in the fourth they were mild. After comparatively short exposure to this fluid, in 3 cases after vomiting or nausea but not in the fourth, complete loss of sensation occurred in the entire trigeminal nerve supply without any implication of its motor portion. For the fourth case the sensory paralysis was partial. Irritation phenomena at first were apparent in the mucous membranes. The sensory loss persisted for months. Taste was abolished in the anterior two-thirds of the tongue on both sides in 3 cases, and on one side in 1 case, for sweet, sour, and salty substances. The pathology was supposed to be neuritis.

SYPHILITIC PARALYSIS OF THE TRIFACIAL NERVES. Complete motor and sensory paralysis of both fifth nerves, without implication of other cranial nerves, Byrnes² believes has not previous to the report of his case been recorded. Hutchinson, Leudet, and Uhthoff have reported instances in which both nerves were involved, but an analysis of their cases shows that the affection was different from that described by Byrnes. His patient was syphilitic. He thinks that hemorrhage into, or acute inflammation of both trigeminal nuclei would be possible, but the subacute

¹ Monatsschrift f. Psychiatrie und Neurologie, vol. xxxix, No. 3, p. 129.

² Bulletin of the Johns Hopkins Hospital, May, 1916, p. 138.

onset of the disease did not suggest hemorrhage, and it is improbable that a pontine lesion of this character could occur without neighborhood symptoms, or even a fatal termination. That intense meningitis was present is indicated by the unusually high cell count in the spinal fluid; but it is unusual to find this degree of meningitis without implication of other cranial nerves. It seems probable to him that a local meningitis existed upon each lateral aspect of the pons, and produced bilateral trigeminal radiculitis. The bilateral auricular eczema was regarded as a possible trophic disturbance resulting from the implication of the Gasserian ganglion. The preservation of taste in the tongue in Byrnes's case seems to show that the centripetal fibers serving this special sense do not enter the central nervous system by way of the Gasserian ganglion.

Recurrent Laryngeal Paralysis from Mitral Stenosis. It does not seem to be widely known that mitral stenosis may cause paralysis of the recurrent laryngeal nerve, and therefore the 2 clinical cases reported by Rosenthal¹ and the case by Guttman and Neuhoof² draw attention to an important subject. Oertner was the first to describe this condition, but from 1897 until the present only 11 cases confirmed by necropsy are said to be found in literature. Oertner concluded that in certain cases of mitral stenosis the left auricle is so dilated that the recurrent laryngeal nerve is compressed against the aortic arch. As a result the nerve degenerates and paralysis of the left vocal cord follows. Other explanations have been given by other investigators.

Cranial Nerve Palsies in Graves's Disease. These palsies are not common in Graves's disease. Heuer,³ writing on this subject, states that only 4 cases of this type appear in American literature, and that at the Johns Hopkins Hospital, among more than 300 cases of exophthalmic goitre, occurring in the service of Dr. Halsted, the case he (Heuer) reports is, with the exception of an occasional mild grade of ptosis, the first instance which has come under observation. The cranial nerves affected are most commonly those controlling the movements of the eyes and lids, but almost every cranial nerve has been implicated. Least common is the group of cases with an associated bulbar paralysis, of which perhaps only 10 have been reported. The case described by Heuer belongs to this group. It was one of rather rapid development and the neurological findings were complete bilateral ptosis, complete ophthalmoplegia externa, paralysis or marked paresis of the motor fifth and of the seventh, bulbar paralysis, hyperesthesia of the skin, and profound muscular weakness.

The clinical picture corresponded closely with myasthenia gravis which may be associated with exophthalmic goitre, but the diagnosis

¹ Journal of the American Medical Association, January 29, 1916, p. 333.

² Idem., p. 335.

³ American Journal of the Medical Sciences, March, 1916, p. 339.

of myasthenia gravis is rejected by Heuer, apparently because of the absence of the myasthenic reaction.

Heuer finds that isolated palsies of the first nerve, and isolated loss of vision have not been reported. The optic nerve has been affected in association with other cranial nerves in one case. The third nerve has been most frequently affected, so that single muscles or all the muscles supplied by this nerve have been involved. Other cranial nerve palsies have also been observed.

The cases of exophthalmic goitre with bulbar palsy have all been severe and in most instances the disease has run a rapid course. The duration of the disease has varied from a few days to five or six months before the onset of bulbar symptoms. Death has invariably followed the appearance of these symptoms, and in the majority of instances within a short time, from one day to three months after the onset of bulbar symptoms.

It is assumed that the disturbances in the cranial nerves are of a toxic nature, the toxins being responsible for the lesions in the cranial nerve nuclei. Clinically, there is some evidence for this assumption, for palsies occur, as a rule, after the disease is well established, and never, so far as is known, in cases of cured exophthalmic goitre. Rare cases are on record in which palsies appeared shortly before the outspoken symptoms of Graves's disease. Comparatively few lesions in the brain have been recorded in the cases of exophthalmic goitre with nerve palsies, possibly because they rarely have been looked for, possibly because the majority of the patients have not died while under observation, and possibly because serial sections of the brain have not been made. The presence of ocular palsies, Heuer thinks, does not contraindicate surgical intervention; rather it would seem advisable to operate promptly in the hope not only of arresting the progress of the palsy but also of curing the disease.

Isolated Paralysis of the Superior Gluteal Nerve. There is no mention of paralysis of this nerve in the well-known works of Bernhardt and Cramer, and the nerve is so well protected between the gluteus medius and gluteus minimus that it is seldom injured. The nerve has no sensory fibers and its paralysis is recognized in the loss of function of the gluteus medius, gluteus minimus, and tensor vaginae femoris. Paul Schuster¹ reports what seems to be the first recorded case of this form of paralysis. The injury was a bullet wound. Among other signs the position of the pelvis was striking. When the man stood on the sound lower limb alone nothing striking was noticed, but when he stood alone on the limb of the injured side the pelvis was lower on the sound side, and compensatory scoliosis occurred, so that the upper part of the body was brought toward the side of the injured limb. The loss of function

¹ *Neurologisches Centralblatt*, 1915, No. 12.

of the gluteus medius and gluteus minimus was brought out by a deep depression behind and above the great trochanter.

Synesthesalgia. Under the term *synesthésalgie* or *synesthésie algique*, Souques¹ describes a peculiar disturbance of sensation resulting from neuritis, especially of the median nerve. Whenever one of these persons with median neuritis and this phenomenon touched with his sound hand any object that was dry and warm, pain was caused in the neuritic hand, but this did not occur if the sound hand were wet. The condition must be distinguished from *allochiria*, which is perceiving an object in the opposite side of the body in a part corresponding to the part touched. In *synesthesalgia* there is no symmetry, the mild rubbing of any part whatever of the unaffected dry side causes pain in the opposite neuritic hand, but the recognition of the part touched is normal. One patient wore a rubber glove on his sound hand in order to prevent pain in the opposite hand of the character described. Wetting the affected hand prevented the *synesthesalgia* so long as the hand remained wet. It is touch alone that produces the phenomenon; severe rubbing, pricking or pressure does not produce it, and touch of the mucous membranes is without effect, as it must be touch of the skin. The *synesthesalgia* may occur with neuritis of other nerves as well as with that of the median, but is a rare phenomenon.

False Innervation. Under this term Oppenheim² understands the innervation of one group of muscles when the individual attempts to innervate a different group. He has observed in soldiers for example, when an attempt is made to squeeze the hand or to make a fist the adductors of the upper arm, the triceps, platysma and other muscles more or less powerfully contract. In some instances the movement is exactly opposite to that intended. In a case of complete musculospiral palsy in which partial recovery had occurred the hand could not be extended, but when the hand was passively extended it could be maintained in this position. When the attempt was made to extend the hand the flexors of the hand and fingers contracted so forcibly as to prevent extension. In another case a paralysis of the trapezius and serratus magnus had occurred and the patient was able to raise the upper limb only to the horizontal, but there was no forward movement of the scapula; on the contrary the inner edge was drawn strongly toward the spinal column by the rhomboid muscles. If the limb were abducted passively and slight pressure were exerted against the lower edge of the scapula sufficient to press the scapula gently forward, the limb could be fully raised. The explanation of this case was that at first the trapezius and serratus were weak, the rhomboid muscles then contracted too forcibly and persistent disturbance of innervation resulted, in that the adductors of the scapula predominated in every attempt at abduction of the limb.

¹ *Revue Neurologique*, July, 1915, p. 562.

² *Neurologisches Centralblatt*, November 1, 1915, p. 802.

In cases of bullet wound of the sciatic nerve with complete paralysis of the foot but with normal electrical reaction, contraction of the quadriceps occurred in the unsuccessful attempts to dorsally flex the foot. Oppenheim urges that when these peculiarities of innervation occur they should be studied and not dismissed as hysterical.

Alcoholic Injections. It is clearly demonstrated from the microscopic examinations carried out by Cadwalader¹ that 80 per cent. alcohol injected into the sciatic nerve of a dog causes intense degeneration, while 25 per cent. alcohol does not cause any marked changes. Injection of strong solutions of alcohol into the facial nerve will stop spasm, but it will also cause paralysis of the nerve. I have hoped that repeated injections of weak alcohol injected into the facial nerve might arrest facial spasm without causing paralysis, and these experiments performed by Eisenbrey, and the examinations of the specimens by Cadwalader, justify the attempt in using weak solutions of alcohol.

Migraine. The study of migraine always is interesting because the disorder appears in so many forms. In the recent paper by J. R. Hunt² cases representing well-known types are described. In one case of ophthalmoplegic migraine a woman in her forty-third year after a typical paroxysm of migraine had a total left third nerve palsy from which she eventually recovered. In a subsequent attack, which was bilateral and progressive, she died. The great importance of cardiovascular changes as an etiological factor in this case Hunt thinks cannot be questioned, and the occurrence of high blood-pressure and vascular degeneration in migraine should be regarded as complications with very serious possibilities.

Hunt has observed the occurrence in two sisters with migraine of isolated abducens palsy developing during the attack. This form of ocular palsy is uncommon in migraine but any form or combination of ocular palsies is known to occur.

Hunt has observed 2 cases of migraine with permanent hemianopsia, and 1 case with hemiplegia. Migraine with lesions of the optic nerve is an especially interesting form. A patient of his, a woman, aged thirty-one years, subject to migrainous seizures since childhood, after a severe attack developed unilateral retrobulbar neuritis with paracentral scotoma, followed by recovery.

Relapsing Facial Palsy Associated with Migraine. Some attempt has been made to establish a facioplegic type of migraine, based chiefly on a case reported by Rossolimo, but Hunt³ rejects the evidence as unsatisfactory, and believes the facial palsy has no intimate relation to the migraine. The recurrent or relapsing facial palsy associated with pain in the ear and occipital region is merely a peripheral paralysis of the

¹ Journal of the American Medical Association, June 5, 1915, p. 1892.

² American Journal of the Medical Sciences, September, 1915, p. 313.

³ Journal of the American Medical Association, March 18, 1916, p. 885.

seventh nerve, and most of the cases are of infectious or refrigeration origin.

Alcoholic Reflex Pupillary Rigidity has been observed by Nonne, Mees and Kehrler, in cases in which syphilis was believed to be excluded. Another case of this kind has been observed by Wilhelm Mayer.¹ A man, in whom syphilis was apparently absent as determined by all available methods of examination, who used much alcohol, had polyneuritis. He had complete reflex pupillary rigidity on the left side and incomplete on the right side, with prompt convergence reaction, and the cause was believed to be retrobulbar optic neuritis, as he had a defect in color sense. Investigation of the optic nerves for neuritis has been neglected in some cases of alcoholic Argyll-Robertson pupil.

Tetanus. The intraspinal *treatment of tetanus by magnesium sulphate*, according to the method of Meltzer, has advantages and disadvantages. Higier,² of Warsaw, says that in the early days of the war antitetanus serum was obtained with difficulty, and furthermore, it had not fulfilled the promises given before the war between Russia and Japan and the Balkan war; therefore they resorted to magnesium sulphate. Their results agreed with those obtained in America. The tetanus patient, previously in continuous tonic spasm, unable to sleep, speak or swallow, perspiring freely and breathing with difficulty, fell into quiet sleep after the injection, the rigidity of the limbs and trunk yielded, the spasms resulting from every irritation ceased, breathing became freer and deeper, and cyanosis and excessive perspiration disappeared. After two to three hours the patient awoke, desired to drink, was able to sit up and to move the hands and arms. The lower limbs, however, were paralyzed for motion and sensation, and the urine could not be voided, and patellar and plantar reflexes could not be obtained. The effects of the injection lasted usually twelve to fourteen hours. The injection of 10 c.c. of a 15 per cent. solution or 5 to 10 c.c. of a 25 per cent. solution was employed.

Disadvantages were these: the injections must be frequently repeated, and they were made with difficulty, and were the cause of respiratory disturbance with asphyxia and cyanosis if large doses were employed; indeed occasionally life was threatened, and cardiac weakness occurred occasionally. Higier's results were unsatisfactory. In one case the symptoms of dorsal myelitis resulted from the injections, and after four weeks showed rapid decline.

Lumbar Pain. According to Sicard and Haguenau³ pain in the lumbar region in a certain number of cases is caused by abnormalities of the vertebrae, in some cases to a bridge of bone between two vertebrae, easily detectible by the x-rays. The fourth lumbar and seventh cervical vertebrae are especially liable to show these peculiarities.

¹ Journal f. Psychologie und Neurologie, vol. xxi, Nos. 5 and 6.

² Deutsche Zeitschrift f. Nervenheilkunde, vol. liv, No. 5, p. 336.

³ Revue Neurologique, July 30, 1914, p. 124.

Clonus in Anesthesia. A clonus of the foot produced under chloroform anesthesia in an operation for removal of a fragment of a projectile near the external malleolus was observed by Alquier and Hagelstein.¹ It disappeared when the patient regained consciousness. The foreign body was supposed by these observers to have caused the clonus, but Babinski, Marie, Souques and Meige remarked that clonus occurs frequently in surgical anesthesia.

Myotonia Atrophica. In the opinion of Fearnside's,² the distribution of muscular wasting has conformed more nearly to classical descriptions in myotonia atrophica than in any other form of myopathy. In a case observed by him no myotonic manifestations were ever detected, and yet the history of familial cataracts and the distribution of the muscular wasting leave no doubt as to the necessity of placing the case among those of myotonia atrophica. The patient's paternal grandmother at the age of forty years developed cataracts in both eyes. A paternal uncle and paternal aunt, both of whom died unmarried, developed cataracts before the age of forty. A paternal aunt and two of her children developed cataracts between the ages of twenty and thirty-eight, and at the present time show no evidence of myopathy. The distribution of the atrophy in Fearnside's patient was myopathic in type. The muscles chiefly implicated were the sternomastoids, trapezii, deep muscles of the neck, serratus magnus, latissimus dorsi, supraspinati, glutei, vasti and anterior tibial muscles, and to a less extent the muscles of the forearms. The fascial muscles also were probably affected.

Fearnside believes that the frequent association of familial and hereditary cataracts with muscular wasting occurs only in myotonia atrophica, and the association has been repeatedly observed. Hoffmann noted that there are families in which some members show cataract without myotonia atrophica, others myotonia atrophica without cataract, and still others both myotonia atrophica and cataract.

Trichina Larvæ in the Spinal Fluid have been found in a case reported by Leon Bloch,³ but there were no symptoms referable to the brain or cord. He refers to Kafka's statement that trypanosomes also have been found in this fluid. The occurrence of the cysticercus is well known. On account of the absence of cerebrospinal symptoms in the majority of patients with trichinosis the spinal fluid has not been examined for the parasite, but positive Nonne and Noguchi tests would indicate meningeal irritation.

Family Periodic Paralysis. Edsall and Means⁴ have made a chemical study of a case of this disease reported by Taylor in 1898, and have

¹ Revue Neurologique, July, 1915, p. 552.

² Review of Neurology and Psychiatry, July, 1915, p. 311.

³ Journal of the American Medical Association, December 18, 1915, p. 2140.

⁴ American Journal of the Medical Sciences, August, 1915, p. 169.

come to the conclusion that while positive statements cannot be made, the findings make it probable that the disease is one of metabolism and not of nervous origin. The question of acidosis is worthy of further study, and the hydrogen ion concentration of the blood might yield valuable information.

Chorea and Pregnancy. Pregnancy usually increases choreiform movements when they are present, but in a case recorded by Lhermitte and Cornil¹ these movements became very much lessened during two pregnancies, and later disappeared for a period of six years. Desertion by the woman's husband then caused them to reappear and they became persistent. The influence of pregnancy in this case was very remarkable.

Organic Paralysis Caused by Hysterical Paralysis. Organic paralysis is often associated with hysterical manifestations, but usually the organic condition precedes the functional or occurs simultaneously with it. In one of Babinski's² cases an hysterical paralysis of one lower limb led to organic paralysis of one musculospiral nerve from pressure of the head of a crutch.

The patient used two crutches but was not aware that he had any disturbance of the other upper limb. Examination showed abolition of contraction of the supinator longus in flexion of the forearm and of the triceps reflex, and tardy contraction of the supinator longus to the galvanic current. These signs indicated clearly that if the pressure were continued palsy in the limb would surely develop. The early determination of such signs is always of great value in preventing serious palsy.

Continuous Partial Epilepsy. This condition is not generally recognized and has been seldom described in American literature. A case with operation was recorded by Spiller and Martin, and in that several small gummas were found in the cortical motor region. More recently a case has been recorded by Burr. The condition is one of continuous involuntary jerking movement confined to a limited portion of the body. As an illustration of this condition the case of Pollosson and Collet³ may be cited. A soldier was injured in the right side of the head by a bullet, and had paralysis of the left hand as a result. The partial epilepsy consisted of constant rapid slight flexion and extension at the left wrist, persisting even during sleep. Operation revealed an epidural hemorrhage, but as the dura was not opened it is not known whether or not a subdural lesion existed. Jacksonian epilepsy implicating the entire left side followed the operation. This form of epilepsy differs from the continuous epilepsy in that it is intermittent, more violent, and is followed by transitory exhaustion paralysis of the affected part. No explanation is offered for continuous convulsive

¹ *Revue Neurologique*, July 30, 1914, p. 77.

² *Ibid.*, May and June, 1915, p. 408.

³ *Ibid.*, p. 291.

movement from cortical irritation in one case and periodic convulsive explosions from similar irritation in another case.

Peripheral Irritation a Cause of Epilepsy. Brown-Séquard produced epilepsy in guinea-pigs by injury of the sciatic nerve, and from these observations it has been assumed that a similar condition may exist in man. Some cases have been reported which seemed to support this view, but epilepsy caused by peripheral lesions is far from being generally recognized. Mairé and Piéron¹ have observed 2 cases bearing on this subject.

A man had his right hand severely injured, and neuritis of the right upper limb and epilepsy developed. Attacks began with an aura of pain in the right upper limb, and the convulsions predominated in the right limbs and sometimes were limited to this side. There was believed to be a connection between the side implicated in the convulsions and the neuritis of the right upper limb. Pressure over the scar of the right hand often was sufficient to bring on an attack.

Another case was one of injury of the right forearm by the bursting of a shell, and this arm became very painful, and convulsions developed. The pain ascended from the right upper limb to the back of the head, and the right upper and lower limbs began to shake. These attacks were believed to be from peripheral irritation; to be manifestations of Brown-Séquard epilepsy. Pressure over the musculocutaneous nerve sufficed to produce pain passing to the head, visual disturbances, tinnitus, and trembling.

In the first case the epileptic attacks developed about four years after the traumatism, and in the second case four months after the traumatism.

Treatment of Drug Habits. The Harrison narcotic law has brought many drug patients into hospitals, and in the Philadelphia General Hospital McIver and Price² have collected the records of 147 cases. They find, among other things, that the majority of narcotic drug habitués are not addicted to the excessive use of alcohol, and that heroin is not as deleterious in its effects as morphin, and can be much more readily withdrawn. The most valuable unit in the Lambert treatment is the method of free purgation. The Lambert treatment, while better than the old method of very slowly withdrawing the drug, is not as satisfactory as gradual withdrawal combined with free purgation and medication to meet the individual requirements. Any treatment which does not take into consideration the presence of the anti-toxic substance in the body long after the drug has been withdrawn, and provide for the observation and care of the patient during this time, is almost certain to be devoid of permanent results.

Botulismus, or poisoning from deteriorated animal food, has been observed to present a symptom-complex similar to Wernicke's polio-

¹ Bulletin de l'Académie de Médecine, January 18, 1916, No. 3, p. 80.

² Journal of the American Medical Association, January 12, 1916, p. 476.

encephalitis hæmorrhagica superior, and the pathology has been regarded as alike in the two conditions. The subject has recently been studied by E. Arnold Paulus,¹ who observed the occurrence of the disorder almost simultaneously in four members of a family after long continued use of deteriorated pork. The symptoms were gastro-intestinal and nervous and in 2 cases terminated in death; but gradually diminished in the other 2 cases. The symptoms of nervous disorder were amblyopia, paralysis of accommodation, diplopia, nystagmus, later almost complete paralysis of the internal and external ocular muscles, dysphagia, dysarthria, bilateral paresis of the facial supply, of the hypoglossus and glossopharyngeus, cerebellar ataxia, finally paralysis of the greater part of the body. The complex of symptoms was almost complete ophthalmoplegia with acute bulbar palsy. In 1 case carefully studied the condition was at first diagnosed as Wernicke's polioencephalitis superior from alcohol. This usually is fatal in eight to fourteen days, and the sphincter iridis and levator palpebræ superioris usually escape in the ophthalmoplegia, whereas in Paulus's case these muscles were paralyzed from the first and were the most seriously affected of all the ocular muscles. Complete internal ophthalmoplegia from alcohol Paulus says has never been observed. He was unable to obtain the organism causing the disorder in his case, and others have not always been successful in finding it in botulismus. There are usually no fever and no diarrhea in botulismus, but on the contrary obstinate constipation, and rapid development of symptoms. The onset in Paulus's case was gradual and therefore noteworthy.

The pathology of botulismus has been determined almost exclusively by animal experimentation, but investigations have been made on man, and in some instances hemorrhages and changes in nerve cells have been observed in the central nervous system. Paulus found capillary hemorrhages and alteration of the nerve cells; it was a polioencephalomyelitis hæmorrhagica, and the lesions fully explained the symptoms.

Lid Nystagmus. Under this term, Pick described a movement of the upper eyelids like that of nystagmus of the eyeballs and accompanying the nystagmus. A case of this kind is described by Popper.² The lid nystagmus was more intense with movement of the eyeballs to the left, as the bulbus nystagmus was more intense in the left movement of the eyeballs; it was also more intense when the upper lid covered the cornea to the upper edge of the pupil. The lid nystagmus was obtained also in upward or downward movement of the eyeballs. When the patient on command looked to the right or left without following a finger, the lid nystagmus was more intense than the bulbus nystagmus. The explanation of this phenomenon is that offered by Pick, *viz.*, a

¹ Journal f. Psychologie und Neurologie, vol. xxi, Nos. 5 and 6, p. 201.

² Monatsschrift f. Psychiatrie und Neurologie, vol. xxxix, No. 3, p. 188.

"diffusion of the disturbance caused by the bulbus nystagmus to the nucleus of the levator palpebræ superioris."

It is known that nystagmus may extend beyond the eyeballs, thus Popper observed a case of multiple sclerosis with head nystagmus.

Raynaud's Disease. An interesting paper on abortive forms of Raynaud's disease is from the pen of Oliver T. Osborne,¹ but some may question whether all the cases he records are properly grouped. He believes that the disorder is not a distinct entity, but is a syndrome caused by the disturbance of one or more internal secreting glands.

There is primarily no real disease of the bloodvessels, but the vasomotor control is so abnormally disturbed that intense contraction of certain vessels may occur in different parts of the body, possibly more or less coincident with abnormal dilatation of other vessels. If the contracted vessels are peripheral the parts more or less lose their function and show various trophic disturbances.

Spasm of the vessels may occur in the internal organs of the body as well as peripherally, but this is much less frequent and more difficult to diagnose.

The syndrome is probably caused by disturbances of more than one of the ductless glands that have internal secretion, but there is always apparently some disturbance of the thyroid gland, possibly a diminution of the vasodilator stuff of this gland. The suprarenal glands also may be at fault.

Thyroid treatment, he believes, causes improvement in the majority of cases, perhaps in all, and cures in some cases. Nitroglycerin is always of temporary benefit and local heat is always of immediate benefit. Iodides may be given to advantage. He divides Raynaud's disease into various grades.

It may be so mild as not to be recognized. Such patients have cold hands and feet, irregular pains in various parts of the body, and they are cold in winter and hot in summer. There may be so much contraction of the peripheral vessels that the internal vessels, especially the abdominal, are dilated, and frequently diarrhea is caused, so that a patient may have a morning diarrhea without other symptoms. There may be such abdominal congestion as to cause various other gastrointestinal disturbances, albuminuria, etc. This kind of congestion or spasmodic contraction of bloodvessels, he thinks, is probably often the cause of ovarialgias, delayed and painful menstruation and menorrhagia.

Those are cases of medium severity in which the hands and feet are very cold, with chilblains of varying degrees, sore fingers and toes, suppuration around the nails, perhaps severe headache, and there may be erythromelalgic symptoms of red face and red hands, with or without

¹ American Journal of the Medical Sciences, August, 1915, p. 157.

pain. There may be faintness or syncope, dizziness, some slight nervous disturbances, as of the eyes, and recurrent albuminuria or hematuria. This condition, he holds, may be one of the causes of albuminuria of adolescence.

Severe cases occur less frequently, in which there may be serious heart disturbances, deep ulcerations of the fingers and toes, serious cerebral symptoms, or severe abdominal symptoms.

Rarely such serious and uncontrollable spasms of the bloodvessels may occur as to cause gangrene and sloughing of parts of the extremities. It is conceivable that fatal heart attacks may be caused by this syndrome.

It will be seen by the above that much is attributed to Raynaud's disease that might be assigned to the vasomotor trophoneuroses, unless this term be regarded as synonymous with Raynaud's disease, which does not seem justifiable. Attacks of transitory hemianopsia with numbness and coldness of the extremities and weak heart, or comatose attacks lasting two or three days might not be generally regarded as belonging to Raynaud's disease. The large group of vasomotor trophoneuroses contains many forms and borderline cases are numerous.

Reflexes. The reflexes of automatism, or of defense, Marie and Foix¹ state, have been known a long time from experimental work, and Charcot, Vulpian and Brown-Séquard have observed them in man, but they have been thoroughly studied only in recent years. They are not obtained in normal conditions but are present in hemiplegia or paraplegia resulting from lesions of the pyramidal tract. They are present in all the limbs but they are most common and most intense in the lower limbs. There are three principal types: (1) the phenomenon of the flexors; (2) the phenomenon of the extensors; (3) the crossed reflex of the extensors. There is also a rhythmical reflex which may be homolateral or crossed.

The phenomenon of the flexors is the most common and most important. It consists of flexion of the foot on the leg, of the leg on the thigh, and of the thigh on the abdomen. The movement commences usually in the foot and extends to the other two segments of the limb. The reflex may be produced by superficial or deep irritation; by pricking, pinching, contact with a cold object, or by passive forced flexion of the toes or transverse pressure of the tarsus. The reflex is usually with extension of the toes, especially when the irritation is at the periphery of the limb, but is usually without extension of the toes from irritation of the thigh.

The phenomenon of the extensors is produced by irritation of the proximal segment of the limb or abdomen. It consists in contraction of the extensors and usually is not very forcible.

¹ *Revue Neurologique*, April, 1915, No. 16, p. 225.

The crossed reflex of extension is very rare and usually weak. It consists of extension of one lower limb caused by irritation of the opposite lower limb, which limb is caused to flex by the irritation. The movements are like those of walking. To test for this reflex, one limb must be extended, the other partly flexed; irritation is then applied to the extended limb. Occasionally the only movement in the non-irritated limb is extension of the foot on the leg.

The homolateral rhythmical reflex is obtained by deep and prolonged pinching of the inner surface of the thigh when the limb is extended; a rhythmical movement then occurs consisting of extension followed by flexion. The contralateral rhythmical reflex is caused by producing the reflex of flexion of the irritated limb, this is quickly followed by extension of the opposite limb yielding quickly to flexion.

Claude and Oppenheim have observed the reflexes of automatism in the upper limbs. They consist usually of flexion of the forearm on the arm with or without pronation, but the movement may be in extension of the forearm on the arm when the irritation is given at the shoulder.

Forced passive flexion of the toes overcomes contraction of the lower limb in extension in any degree of tonicity, by causing inhibition of the extensors. A limb so rigid that passive flexion of it may be impossible may become supple and flex from passive flexion of the toes. Inhibition may be shown when there is clonus of the foot, patella or buttock. After producing the clonus the examiner may arrest it at once by deep pinching of the lower limb, especially of the thigh.

These reflexes of automatism have been studied experimentally especially by Philipson and Sherrington and as produced in the animal they resemble closely those seen in man under pathological conditions.

In hemiplegia they exist at the onset of the stroke, the phenomenon of flexion is then usually constant and pronounced and diminishes somewhat in intensity later. They are more intense on the paralyzed side but may also be present on the other side, and are more pronounced in the lower limbs, but may also be observed in the upper. In old hemiplegia they are always localized to the paralyzed side, but irritation of the sound lower limb may cause extension of the paralyzed lower limb without flexion of the sound limb. The intensity of these reflexes is usually proportional to the intensity of the paralysis. When hemiplegia occurs with contracture in flexion or tendency to such contracture, these reflexes usually are intense while the tendon reflexes may be feeble or absent.

In paraplegia from systemic degeneration of the pyramidal tracts the exaggeration of the tendon reflexes is greater than the reflexes of automatism, but where there is more complete interruption of the cord the two forms of reflex are more nearly equal. In general the more profound the lesion the more the reflexes of automatism are

developed, and in grave and progressive affections they increase in intensity when the tendon reflexes begin to diminish. This combination indicates a progression of the lesion and is a bad sign. The exaggeration does not continue indefinitely, they are more intense when the transverse destruction of the cord is great but not complete. They are very intense in paralysis from compression of the cord and are associated with spontaneous spasms of the muscles, sometimes very painful, sometimes painless. The pain may be with almost complete anesthesia of the lower limbs.

These reflexes are usually found with posterolateral sclerosis and tabes associated with hemiplegia. Their intensity offers a marked contrast to the absence of tendon and cutaneous reflexes, and they may be with extension of the toes in the Babinski reflex. The quickness of these reflexes may depend in part on the implication of the posterior columns and the cerebellar tracts.

The extent in which these reflexes may be obtained indicates the lower level of a spinal cord lesion, as they cannot be obtained in the portion of the body innervated from the level of the lesion. It must be remembered, however, that the energy of these movements decreases as the irritation is applied toward the trunk. The absence of these reflexes from irritation of a given region is important only when they are obtained in marked intensity from irritation of an adjoining region, and this occurs with compression of the cord. The inhibition of the patellar clonus should also be tested in such a case. When this clonus has been produced by an assistant, deep pinching of the skin will arrest it provided the pinching is done below the region innervated by that portion of the cord where the lesion is situated. Pinching of the skin above the portion innervated from the level of the lesion has no effect on the clonus. It is also important to remember that the extent of the lesion in the cord does not always correspond to the area of compression, but may be considerably greater.

A lesion compressing the spinal cord will implicate several roots arising at a higher level, consequently the muscular atrophy so produced will extend higher than the reflexes of automatism indicate the lesion to be, as these depend on implication of the pyramidal tract. This grouping of symptoms indicates an extramedullary lesion. Transverse myelitis or any intramedullary lesion causes atrophy by implication of the cells of the anterior horns. The pyramidal tracts are sufficiently altered by the lesion to permit the reflexes of automatism to be obtained higher than the atrophy indicates the lesion to be. This grouping of symptoms points to an intramedullary lesion. These findings are especially applicable to the lower part of the cord where the intradural roots are long. In paraplegia from extramedullary lesions the level of the reflexes of automatism is lower than the level of sensory symptoms.

I have devoted much space to these reflexes of automatism because they promise to be of great diagnostic value and as yet little has been written about them in English. I have referred to them in previous articles in *PROGRESSIVE MEDICINE*. They should enable us to be more exact in clinical diagnosis.

Walshe,¹ in studying these reflexes in which flexion of the whole lower limb occurs, concludes that certain muscular contractions may not be seen. In the case of the toes where the effect of gravity is negligible, as it cannot be in the case of more proximal joints, a hallux movement betrays the least contraction of the extensor longus hallucis. In a feeble reflex this may be the only visible effect, but it is by no means the only one present, and careful investigation has led him to conclude that an isolated extensor response of the big toe does not occur. It is invariably accompanied by contraction of the proximal flexors of the limb, and in all cases a palpable contraction of the semitendinosus and semimembranosus can be felt, while in a majority where the reflex is well developed an actual movement of flexion at hip and knee obtains. These conclusions are opposed to Babinski's, who does not believe the extensor response of the big toe is a part of the flexion reflex of the entire lower limb. The extensor plantar response Walshe holds is not the minimal motor response, as there may be hamstring contraction alone from plantar irritation. The question must be decided whether limb flexion is ever associated with plantar flexion of foot and toes. In two instances Walshe observed slight actual plantar flexion accompanying limb flexion; it was not, however, an active movement, but a passive pull when the foot dorsiflexed, since if the dorsiflexion of the foot was prevented and the angle between foot and leg maintained constant, this movement did not occur. In one class of case active plantar flexion does occur, but graphic records show that it precedes a dorsiflexion movement of the toes which synchronizes with the limb flexion. He thinks it is open to question whether the normal plantar reflex of the toes is a coördinated movement involving contraction and relaxation of opposing muscle groups, that is, "reciprocal innervation," such as the pathological extension reflex undoubtedly is.^{1c}

Whether the involuntary flexor spasms which may occur in spastic paraplegia are spontaneous or not is uncertain, as any manipulation of the limb, or any light cutaneous stimulus such as that of cold when the bedclothes are removed, increases the spasm. They seem to indicate a condition in which the threshold of stimulation is extremely low. Flexor spasms of the lower limbs also occur in paraplegia in extension, though more common in paraplegia in flexion. In the former case they are usually alternating in time in the two limbs and not simultaneous; in the latter case they are often bilateral and synchronous.

¹ Brain, 1914, vol. xxxvii, p. 269.

Every coördinated movement involves, as Sherrington has shown, both excitation and inhibition, and in this way is explained the fact that a sudden pinch of the skin of the limb will stop an ankle-clonus. Brown-Séquard pointed out that clonus of a spastic limb could be stopped immediately and the limb made pliable by forcible plantar flexion of the hallux. These irritations arouse the contraction of the muscles which flex the limb and thereby inhibit the extensors. Walshe states that if the knee-jerk in a case of spastic paralysis be rhythmically elicited and the sole of the foot of this limb be then briskly stroked for some seconds, the jerk usually diminishes in force, even when the reflex flexion is not sufficient to prevent it mechanically.

Certain writers have recorded that in certain cases of spastic paralysis in which the extensor type of plantar reflex is obtainable, there occurs, on stimulation of the crossed foot, a plantar reflex of flexor type. In hemiplegia an extensor plantar reflex is obtained from the affected limb, but on eliciting a plantar reflex on the sound side a flexor plantar response is seen on the affected side. Examination of this crossed response, Walshe says, shows that it differs fundamentally from the normal plantar reflex. The normal form consists of plantar flexion of digits, dorsiflexion of foot, constant contraction of the tensor fasciæ femoris, and certain inconstant contractions of the limb musculature. The crossed plantar response, examined in the extended limb, consists of plantar flexion of both foot and toes, but no tensor fasciæ femoris contraction. The crossed reflex seems to be indicative of active extension of the limb. If the limb be previously flexed and supported lightly so that no resistance is offered to active extension and the crossed sole be then stimulated, there occurs an active extension at hip and knee as well as the movements already described. The crossed flexor response of the toes Walshe regards as a part of a crossed extension reflex of the limb, usually the two movements occur together, rarely the plantar flexion occurs alone, but he has never seen crossed extension at hip and knee without plantar flexion of foot and toes. He states that a well-marked flexion reflex of a limb may be present without any evidence of crossed extension, which is no integral part of the reflex. The factor determining absolutely the occurrence of the crossed extension reflex is the presence of reflex activity in the extensor muscles of the limb. The indications of reflex activity of this group of muscles are increased knee-jerks and ankle-jerks, the presence of clonus and spasticity in extension. Crossed extension of a limb is not seen in paraplegia in flexion which is characterized by absence or diminution of the reflex activity of the limb extensors, while in the flexors this is conserved and increased. In one case in which Walshe observed spontaneous knee-clonus, the eliciting of the flexor reflex caused an inhibition of the knee-clonus on the same side, but so increased the tonus of the crossed extensors that they went into well-marked tonic spasm, which relaxed and resumed the clonic form on cessation of the stimulus.

The homolateral extension reflex Walsh has seen only five times. It is obtained on stimulation of the skin of the upper extremity of the thigh and of the perineum, and consists in a quick extension at hip and knee with plantar flexion of ankles and toes. The crossed extension reflex is only seen in cases of hemiplegia and of paraplegia in extension. It does not occur in paraplegia in flexion.

The transition from paraplegia in extension to paraplegia in flexion is found only in increasingly extensive transverse lesions; it depends on more and more complete severance of cord and brain. It is characterized by progressive disappearance of reflex activity in the extensor group of muscles. In complete transverse lesions of the cord there may be reflex activity only in the flexors, and this may be a minimal response and obtainable only from the distal extremity of the limb. It may be only a hamstring contraction without toe movement, and without any sign of reflex activity in the extensors.

A very important statement made by Walshe is that even profound interruption of central afferent paths has no modifying effect on the flexion reflex. It is not possible to make so absolute a statement as regards the crossed extension reflex. This reflex depends for its occurrence on the presence of a reflexly active extensor group of muscles. It is not the rule to find this condition in cases of complete or extreme sensory loss. The integrity of at least some afferent paths to the brain is essential for the presence of reflex activity of the extensors.

Walshe is convinced that the degree of pyramidal involvement has no influence on the form of spasticity in the leg, and that a pyramidal lesion, when uncomplicated, gives rise always to the extension form of spastic paralysis in the lower limb. Paraplegia in flexion, according to him, never occurs from cerebral lesions. It would appear that, as in animals, we have in man two separate systems of innervation of the limb musculature, each employing a definite group of muscles and giving rise in each of these to a specific form of activity, tonic in the one, clonic in the other. The extensors need for the maintenance of their hypertonus, the integrity of a reflex arc passing from the muscles themselves to a reflex centre in the gray matter of the brainstem, probably the paracerebellar nuclei. The efferent limb of the arc consists of an extrapyramidal tract passing thence to the ventral horn cells of the extensor muscles. The reflex activity of the flexors, on the other hand, is unaffected by the interruption of this path to their antagonists, and the reflex arc is purely spinal. There is tonic innervation of the extensor group of muscles in the lower limb by an extrapyramidal projection system, in addition to its corticospinal innervation by the pyramidal system, the flexors of the limb having an innervation by this latter system alone.

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